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Introduction to  
**PSYCHOLOGY**

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S. JALOTA

*SIXTH EDITION*

OXFORD UNIVERSITY PRESS

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# INTRODUCTION TO PSYCHOLOGY

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*Former Professor of Psychology, Punjab University,  
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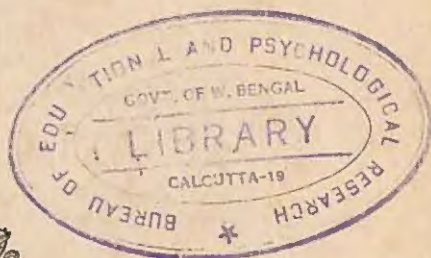
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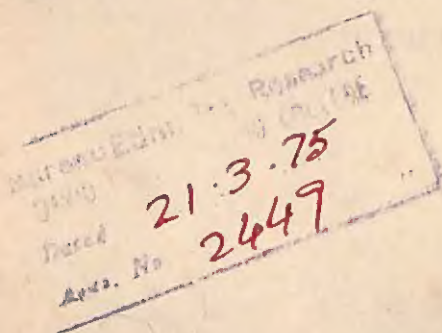
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## PREFACE TO THE SIXTH EDITION

I have taken this opportunity to thoroughly revise this book. I have attempted to clarify some statements, and emphasize a few points of view that have gained recognition in recent times. I still feel however, that an eclectic view-point is most suited to satisfy the eager curiosity of the younger readers with open minds and no prejudices. Hence, a number of theoretical view-points have been mentioned in an unobtrusive manner. Thus the theoretical framework is there for the discerning reader, without many intricacies of detail. I have refrained from entering into finer speculative implications that are still to be widely accepted. Current controversies add the spice of critical consideration to the detailed application of theories: but that is primarily the scope of a post-graduate text. I have been content in this *Introduction to Psychology*, to browse along the borders, rather than poach into the wider fields.

I am convinced that this leads to the better build up of basic concepts; which will help the reader to relish the refined stand-points that try to explain and clarify the varied facts and ardent behaviours of psychology. He will not be carried away thus by each capricious wisp of passing controversy, but consider each fresh concept in the light of his background of facts. I thank all those friends and colleagues, from far and near, whose remarks have helped to improve the utility of this text. I feel confident that its many readers will also endorse this endeavour.

S. JALOTA

Munshi Colony,  
University of Gorakhpur



## PREFACE TO THE FIRST EDITION

There is a dearth of suitable textbooks of Psychology for preliminary reading by Indian students. Some of the Universities of India have under consideration the introduction of Psychology as a subject for study into the Intermediate Arts and Science courses, and Mr S. Jalota has written a little book to help such students. Considering the progress Psychology has made in various directions in recent times, the selection of topics for preliminary reading requires careful handling. Mr Jalota has acquitted himself well, and has given under each head all possible information that a student in the Intermediate Arts or Science stage is expected to know. Mr Jalota has had in view the special requirements of Indian Universities and this book should prove useful to the students for whom it is meant.

22 October 1938

G. BOSE



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## TO THE READER

### DEAR READER

You are either a beginner in Psychology, a student, or an expert, a teacher of that subject. If you are a student, I hope you will be able to follow the facts and principles of the science of Psychology given in this book.

When you try to solve the questions on the text given at the end of each chapter, you will be taking useful steps towards the understanding of Psychology as an 'experimental science'. If you find any of the explanations hard to understand, please let me know, and I will try to improve them.

If you are a teacher, you will notice that every fact mentioned in this book could have been supported by quotations from scores of eminent authorities. I have refrained from burdening the text with references for two reasons : (i) Every teacher of the subject can easily discover and supply them ; (ii) They are very seldom of any use to elementary students. Further, you will find the examples are generally homely, and taken from common Indian life. This is, I hope, an important merit of this book for the Indian student.

I think you have formed some opinion about the claims of the conflicting schools of Psychology. You may be a behaviourist, an admirer of the *Gestalt*, or an enthusiast for the hormic point of view. So you may be a little surprised to find that this book does not consistently present any one of these views. Its eclectic nature, however, should prove a source of greater good to your elementary students. This book presents the point of view which is most easily intelligible, for I believe one must rise above the narrow limits of any single theory in order to evoke a ready understanding from young readers.

The constant references to the bodily processes should satisfy a behaviourist. The general reference to the rela-

tion between cognition, affection and conation, and the stress upon the analytico-synthetic activity of perception should be appreciated by an admirer of the *Gestalt* hypothesis. And the frequent mention of processes, activities and changes should be favourably considered by the hormist. I recall that by trying to satisfy everybody one usually ends by satisfying none, but I believe that a perusal of Professor C. Spearman's *Psychology Down the Ages* (1937), Vol. I, ch. iv, and Vol. II, ch. xxvii, would incline you towards a favourable view of the manner of presentation I have adopted.

I have endeavoured to give *facts* only, for I think it is a wise policy to reserve all theoretical discussions about these facts for the Degree and advanced students. We must have an acquaintance with the facts before we start discussing them. Otherwise our discussions, howsoever thorough they may be, are likely to leave a beginner hopelessly confused in a maze of hypothetical entities. I think this view is reasonable. But there may be another that has a stronger appeal to you. In that case I shall be only too glad to read your book.

Dalpat Gardens  
Phagwara  
September 1938

S. J.

## Chapter I

### DEFINITION, SCOPE & METHODS

#### 1. *General*

This world is a wonderful mixture of a very large variety of things. We find the sun, the stars, rivers and mountains, plants, animals and human beings. But this infinite variety of objects can be easily divided into two broad classes : (i) objects that are non-living such as stones, rivers, iron, and silver ; (ii) objects or organisms that are described as living, like plants and animals. As students of Psychology, we are not much concerned with the group of non-living objects. They are usually described by the sciences of physics, chemistry, geology, etc. Our science is more intimately interested in the class of living objects or organisms. We have two main groups : plants and animals. Living organisms grow and develop by taking food from their neighbourhood. But a piece of stone lying beside a stream remains as it is, even if it is left there for years. A mango plant, however, in the same place would grow tall in a few years and produce branches, leaves, flowers, and fruit, according to its stage of development. The plant is alive, it obtains its food as chemicals and salts from the soil around its roots, and changes them into parts of its own body. All living beings have the ability to assimilate portions of their environment. Plants use their leaves to get oxygen from the air. Many animals like cows, goats, etc. live on grass and other fodder. Thus all living organisms maintain their bodily identity through food, growth and development, and continue their own species through reproduction. The plant gets all that it needs from the bio-chemical activity of its roots or leaves. The animal also tries to secure all that it needs through the activity of its various organs for knowing and acting upon the environment.

Some living beings are conscious. In the present state of our knowledge we are not certain that plants can be conscious of what is going on near them, or of what is happening to them. But we are certain that all animals from the smallest single-celled amoeba onwards do show conscious behaviour. For instance, if you pull the leaf of a tree, or stick a pin into its trunk, the tree will not show any change in its behaviour towards you, when you do the same again. This shows that the tree has no memory of the past injury. One may even doubt whether the tree had any consciousness of pain resulting from the injuries done to it. Hence we cannot be certain about the existence of conscious experience in plant life. But in the case of animals we have definite proof of conscious or mental life. If you pull the ears of a cat, or prick it with a pin, it will not come near you again, but will spit at you on sight. The change in the cat's behaviour towards you shows that the cat remembers the pain you caused it. In other words, on the earlier occasion the cat was conscious of 'pain'. But the tree perhaps was not conscious in the same way. Hence, we may say that plants have life ; but they do not have any conscious or mental life ; and animals enjoy not merely life, but also mental life.

There are many sciences that deal with living beings. Each science limits itself to a definite field of study. It tries to describe the objects and events in the given field. Also, it presents the probable relations among these objects or events. Thus, it often attempts to offer plausible explanations for the various objects, the development of objective relations and the different events or activities going on within its field. Animals and their activities are studied in sciences like biology, zoology, comparative anatomy, physiology, psychology, and so on. Biology deals with the general principles or truths about living organisms. Zoology describes the various kinds of animals,



and the family relations which are found among them. For instance, the horse and the zebra, the cat and the tiger, have important points of relationship. Comparative anatomy tries to describe the shape, size, number, and so on, of the various bones, nerves, muscles, and other tissues which are found in a certain class of animals, such as horses, cats, rats and frogs. Physiology deals with the functions of the various bodily parts which are found in an animal. For instance, it studies the functions of the nervous system, the blood circulatory system, the respiratory, digestive and excretory systems, the sense-organs, the muscles and glands, etc. Psychology studies the general truths about the mental activities of animals.

## 2. Definitions

The word 'psychology' is a combination of two Greek words *psyche* (soul) and *logos* (word or talk). So it means 'talk about the soul'. But, in modern times, the word 'psychology' is especially taken to mean 'science of the mind'. Each science consists of our knowledge about some definite subject matter. Scientific knowledge, however, is not the same thing as any common drawing-room conversation. A science is an orderly discussion about one subject. The discussion is not random and order-less like the conversations which take place among a group of people. One man for instance talks of poetry, another of poverty, the third of thieves and laws. In this case, there is no system or order in the conversation. There is no single idea or subject binding the four topics together. The topics have become related in the given order by chance. But in the case of a 'science' there is a systematic description of the various kinds of facts and qualities concerning one definite subject. A science aims at giving a complete and accurate account of its subject matter. And as our knowledge of a subject increases so does its science grow. At first we simply collect facts or observa-

tions about the given subject. In psychology we come across various facts of mental life, e.g. sensations, memories, feelings, emotions, desires, decisions, imaginations, thinkings, etc. Later, we try to put similar facts into separate classes; and then look for rules about the relation between these facts and the classes of facts. We put all sensations, memories, imaginations and thinkings, in one class as processes of knowing. Feelings and emotions, are brought together as the group of affective processes. In the same way, all varieties of desires, decisions, etc. are considered together as processes leading to action.

Again, we often find the various processes combine with each other, and interact upon one another. Even simple activities of friendly association and playful exchange, show complex and rich inter-relations of many mental processes. The student of psychology tries to analyse the complex behaviour of the individual. He tries to understand the developments of these mental experiences. He indeed hopes to find out the principles of their interaction. Discovery of truth and not mere amusement is the aim of a science. The search for rules is followed by the labour of proving them. This often takes a long time and several generations of workers. When a science is able to establish facts or laws, then it reaches a stage towards the ideal of complete knowledge. All modern sciences are more or less incomplete. *So the science of psychology is an orderly, truthful, and as far as possible complete account of the mental life.*

We have already said that the word 'psychology' means a talk or science about the soul. This was its meaning in ancient times. But gradually the question was raised, *What is the soul?* There are so many answers to this single question that one finds it very difficult to trust any one of them. Some say the soul has a shape that fits the body: but if such were the case, the soul of a lame

man would be lame, and that of the hunchback would be a hunchbacked soul. The soul would grow tall and strong with youth, and bald and weak with the body's age. Such a soul would not be immortal, all-knowing, or in any way different from the physical body. Again, some say that the soul is as small as 'the size of the thumb'; while others say that it is as big as the whole universe. Some hold that each soul is connected with only one body, but others believe that each soul can pass or migrate from one body to another, or one kind of animal to another. So today no man can be definite about the shape or size, the qualities or the properties of his soul. In the absence of any definite knowledge of the 'soul', it is idle to talk of the 'science' of the soul.

[No human being can deny conscious experience.] All of us come to know objects in certain ways, e.g. a mango is yellow in colour, it is sweet to taste. One is pleased to eat it, and often wishes for another slice. All these processes of knowing, feeling, wishing, are conscious processes. The 'mind' therefore has conveniently been described as 'the sum total of mental processes' in an individual, going on from birth till death. So, later on psychology came to mean the 'science of consciousness' or the science of conscious mental life. This definition serves our purpose to some extent, that is, when we study merely our own conscious processes. But the moment we wish to extend our observations to our neighbours, then we are face to face with an insoluble problem. Conscious experience is a strictly private process. We cannot *directly* observe the conscious experience of other men. I cannot know the pleasure of my friend when he sees a picture. I cannot know how earnest he is in his praise of it, in the way I know my own pleasure or earnestness. So many people think that the subject-matter of psychology is strictly a private affair. The conscious experience is directly known by one individual only. So it is sometimes

described as 'the study of the individual's point of view'.

It is evident that if the subject-matter of psychology is limited to one individual, then its usefulness will be equally limited. Since our aim is the study of mental life, it becomes necessary for us to study the mental processes of others besides ourselves—other men, children, savages, even lower animals. And there is a simple method which is often employed. Supposing you hear a joke: you like it and laugh. If you repeat this joke to another person, and he also begins to laugh, then you are fairly certain that he heard the joke and liked it. Now the *hearing* and the *liking* of a joke are mental experiences of your friend. You cannot directly know them. But by observing his laughter, you can indirectly infer his consciousness of 'hearing' and 'liking'. His laughter is his bodily behaviour. This is a *public* fact and can be noticed by a number of other observers at the same time. They can compare their observations and be sure about their knowledge. Thus an observation of behaviour, which is not a private but a public process, can lead to a knowledge of the mental life of a man, or animal. From this point of view it seems useful to describe psychology as *a study of behaviour*. However, we must bear in mind that the study of behaviour by itself is not the only aim of psychology. The study of behaviour is the means which leads us to a knowledge of the mental processes, which is the real aim of our science.

Mental processes are best realized as conscious processes. However, we are often *not* aware or conscious of certain mental processes. When we try to learn cycling or typewriting or knitting, at first we are keenly conscious about the movements of our hands and feet, or fingers. We are conscious of directing them this way and that way, and we enjoy our success, or are sorry at our failure. But with long practice, we perform those movements without any consciousness. Our hands and feet and



fingers go on mechanically. There is no conscious direct control, yet the several movements are perfectly ordered. Because our typewriting or knitting produces the very words, or patterns, that we desire, we have to admit that some control has been working all the time. But we are not conscious of these controlling activities. The controlling processes that we know very well are conscious processes; so the processes that control habitual movements (like typing or knitting) may well be described as not-conscious or un-conscious processes. It is often suggested that it is a function of the mind to control, direct and enjoy the bodily activities. We have seen that controlling and directing processes of our habitual actions are often 'unconscious'. The enjoying processes of pleasure or sorrow are mostly conscious. So we can say that the mental processes are not merely conscious, but also unconscious. 'Non-conscious' processes are not directly known by the individual. He can be sure of their presence or activity only by observation of his own behaviour. If I write a letter and forget to post it for two or three days, I may readily believe that there is some unconscious objection, or desire to delay the posting of that letter. If A is not aware of any love for B, but feels jealous when B favours C, then observers are easily convinced of A's real feelings for B. Hence, it seems unfair to limit psychology to a study of conscious processes alone. Keeping in view the entire field of psychological activities, we may finally decide in favour of this definition : *Psychology is the scientific study of all mental processes, as expressed in bodily behaviour and as observed in direct experience.*

### *3. Scope and Problem*

The scope or the field of psychology has an intimate relation with its accepted definition. If we define psychology as the science of conscious mental life, then our field

will be limited only to directly known conscious experiences of human beings. But if we define psychology as a study of behaviour, then its field will include animal behaviour alone. According to our final definition given in the preceding paragraph the *scope* of psychology extends to all mental processes. They may be conscious or unconscious, they may be normal or abnormal, they may be found among men or the lower animals; and they may be observed in a single individual or among a group of men or animals. The problem of the psychologist is to find out the various classes of mental processes; analyse them into the simple or elementary processes and try to discover those rules, principles, or laws, which can help him in understanding and explaining the origin, growth and development of the various mental experiences.

Further, since a number of mental processes are known only through the observation of bodily behaviour, so a knowledge of the bodily mechanisms will help us to understand the accompanying mental processes. Hence on many occasions it is found convenient to explain certain mental experiences by reference to certain bodily processes. For instance, the experiences of seeing and hearing can be easily understood, and explained, by referring to certain bodily processes in the eye, or the ear. Thus it is also the business of a present-day psychologist to try as far as possible to explain mental facts by reference to bodily changes, especially nervous changes.

#### 4. Methods

The most common method of every science for the collection of its facts is the method of *simple observation*. But this method is not always to the point. We ordinarily observe a large number of things, and most of the observations may be either useless or unnecessary for the purpose of a particular science. The men and women whom

we see walking on the roads, the arrangement of goods that we see in the shops, the references to desires, fears, feelings and imaginations that we daily hear in the course of our normal lives, may have little connexion with the types of problems that may be interesting to us as students of psychology. If we are interested in the 'durability of memories', a sixty-year-old man's reference to his experiences at the age of eight may perhaps be of some interest. But if I have no scientific interest in the development of language-ability in a child, no amount of hearing the play of a 'babbling' child will be of any use to me. We have not merely to collect material connected with mental life, or expressing mental activity, we have also to *select what is relevant* to the problem we may have in hand.

Further, simple observation is liable to many mistakes. We are often prejudiced. It is well known that a mother finds it difficult to admit the dullness of her child. If the child does an ordinary thing, the mother considers it extremely brilliant. This is a case of *wrong observation* or *mal-observation* on her part. Again, when two children of different mothers quarrel, the mother of each honestly seems to find all the blame in the other's child. Each *ignores* or *non-observes* unpleasant defects in her own child. Often prejudice against a contemporary makes us easily misunderstand his statements, just as ordinary selfishness makes us readily over-estimate our own abilities or qualifications for an important post. Scientists too commit similar mistakes. They may be prejudiced against a certain man or his theories, and thus misunderstand his arguments and mal-observe his facts. Others often ignore facts which do not fit in with their own pet theories. So to remove the defects of mal-observation and non-observation from the method of 'simple observation' it becomes necessary to modify it. Instead of waiting for the event to take place, we may prepare our own conditions,

and try to observe the facts without any prejudice. This observation of a fact under prepared and controlled conditions is known as an *experiment*.

We all remember many facts in the course of a day. But most of our memories are mixed up with our emotions and interests. A boy may remember everything of a cricket match that took place six months back, but he may not remember anything of a lesson in algebra which he learnt two days ago. We can decide nothing about his memory by the simple observation of his remembering the cricket match, or his forgetting the algebra lesson. Nor can we compare his memory, on the basis of these observations, with that of another boy who can correctly recall a poem learnt one month back, but cannot clearly recall the incidents of the cricket match. Here are facts obtained by simple observation, but they are not very useful for scientific inquiry.

But if we have a list of twelve syllables (without any meaning-interest), and let a boy hear them repeated three times, and then find out the accuracy of his memory, then we have an experiment. This will enable us to know more definitely about his memory-ability, and also to compare him with others, judged by their ability in the same task. In this case our observation is without prejudice, and therefore accurate. We can also modify our conditions by increasing or decreasing the number of words in the list; by having more or less than three repetitions or readings; or by asking the person to try to reproduce the list from memory (i) immediately after learning it, (ii) thirty minutes later, or (iii) some hours afterwards. Such modifications will lead to a more complete knowledge of the processes of remembering than would be possible otherwise. It is such experiments which are useful for a science, and they are often employed in psychology.



### 5. Psychological experiment

The observations and experiments which are employed in psychology differ in one important respect from those used in other sciences. In physics and chemistry the matter and its changes can be observed by a large number of persons at the same time. These observations are like inspections from outside. The observers are outside the matter and the changes that take place on the laboratory table. But in psychology we have to study the mental processes, and these are directly experienced by one individual only. Moreover, they seem to go on 'within' him. So he has to turn 'inwards' to observe them. For instance, if you want to know the taste of tea, you will first take a few sips, and then try to analyse the taste into touch, temperature, smell and taste elements. In this case your method may be described as 'looking inwards' or *introspection*.<sup>1</sup> When this introspection is carried on under experimental conditions then it may well be described as 'experimental introspection'. This used to be the main method of psychology. Nowadays introspection is often supplemented by the observation of the individual's behaviour. While engaged in tasting tea, he may look relieved, appear to smile and show satisfaction. He may speak and comment upon the taste. Also, we may note that he is taking a keener interest in the given situation. All these would go to fill the record of his behaviour during the experimental condition.

There is one objection to the method of introspection. When you are looking at a picture, your experience is that of 'knowing the picture' (i). But when you introspect the same experience, you are trying to 'know the knowing of the picture' (ii). The normal and the introspective processes are so different that the results of the

<sup>1</sup> Sometimes this is described as SUBJECTIVE observation, and the ordinary observation of behaviour is known as OBJECTIVE observation.

second can tell us very little about the state of the first. So it is argued that introspection is impossible, because it changes the very process under observation. Further, it is said that in trying to look inwards, we have to divide the mind into two parts, the one for 'knowing the picture', and the other for 'knowing the knowing of the picture'. It is said to be an impossible task. The mind acts as one unit. It cannot be so easily divided into two distinct parts. It is like trying to cook one half of a hen, and keep the other half for laying eggs.

All the objectors, however, are agreed that immediately after seeing the picture, we can recall, and observe, the recalled experience. This memory is a complete and faithful copy of the original experience. Further, being a memory its character will not be changed through repetition, or time, or careful analysis. Thus the method of psychology is properly speaking *retrospection* (A. Comte). This 'retrospective introspection' becomes reliable if it is corroborated on later occasions. There is no doubt that with practice a number of the so-called drawbacks of introspection are removed. If one has the proper amount of patience, one may become an expert in introspection; and when a number of experts agree about any mental fact, then that fact attains scientific certainty. Where introspection is impossible or difficult, we have to depend upon evidence from records of bodily behaviour. In such a case, we also have to note the situation or stimulus that leads to the bodily activity. Since our science includes non-conscious experiences, an experimental observation of behaviour under controlled conditions becomes the *second* important method for modern psychology. Information from behaviour may support and supplement the knowledge obtained from introspection. Where both the methods arrive at the same conclusion, we establish the accuracy of our facts.

Usually two people are engaged in a *psychological*

*experiment.* The person who introspects is known as the *Observer* or *Subject*. The other person provides the necessary conditions or stimuli, and changes them whenever necessary. He is known as the *Experimenter*<sup>1</sup>. The observer is usually seated in a comfortable position. He is expected to be fresh, and unprejudiced in his observations. Often he is ignorant of the conditions of the experiment. He gives his report immediately after his observation, unless he is required to do otherwise. The experimenter keeps a record of the stimuli and the responses or bodily changes of the subject. He may take the help of simple or elaborate recording apparatus to suit his requirements and his means. He may measure the time of an activity in seconds, or employ stop-watches that can measure in fifths or tenths of a second. He may even use delicate electrical chronoscopes that measure a hundredth, or a thousandth part of a second.

Since single observations are not always reliable, so on many occasions a large number of observations are taken with each observer ; and there may be many observers or subjects. The facts so collected are analysed with the help of more or less elaborate mathematical formulæ. The statistics generally describe the central tendencies, the range of variability and the importance of the observed differences. To sum up, the chief method of psychology is *experimental introspection*. The facts are often supplemented by records of bodily behaviour ; and frequently figures for reliability and validity of the observations are considered essential.

## 6. *Branches of psychology*

The science of psychology has split up into many branches. They are usually named after the nature of the special subject, or the method employed in it. The

<sup>1</sup> The observer is described by the symbol *O*, the subject as *S*, and the experimenter as *E*.

term General Psychology is applied to the study of the normal mental processes of the adult human being. The terms Animal Psychology, Abnormal Psychology, Child Psychology, Educational Psychology, Medical Psychology, Social Psychology and Industrial Psychology explain themselves. In every case the mental processes are studied, and the rules or principles of their origin, growth and development are discovered. Usually the methods of General Psychology are employed in these special branches. But on many occasions the special problems give rise to special methods.

Animal Psychology refers to the study of the behaviour of lower animals like apes, dogs, cats and also of the very small animals that can only be seen through a microscope. Child Psychology deals with the nature, growth and variety of the mental life of human children. In both child and animal psychology we have to depend mainly upon the method of the observation of behaviour. These studies also give us important information about the origin and development of our adult mental processes. Educational Psychology gets most of its material from the above-mentioned studies, and its studies of the methods and limits of education supply rules for the teacher. Medical and Industrial Psychology are both practical as well as theoretical. The former deals with the nature, treatment and cure of mental diseases. The latter is concerned with estimating the fitness of men for particular jobs, vocational guidance, the economizing of human energy in the performance of industrial tasks, and the problems concerning work, fatigue, rest. Social Psychology tries to find the rules that may explain the behaviour of groups. An individual's behaviour often changes when he is the member of a group. A child, alone, may feel afraid of a small dog, but in a group of children, or when in the company of his parents, he may walk by unafraid or even attack the dog. Human beings have

been grouped in different societies and communities, and have various customs and legends. The origin and development of customs and folklore are extremely interesting. Psychology in every respect is a developing science, and the last word has by no means been said in any one of its numerous fields.

### QUESTIONS

1. What is a science? How do you distinguish it from a talk?
2. What is wrong with the definition, 'psychology is the science of the soul'?
3. What is the advantage of defining psychology as 'the science of behaviour'? How far should this definition be further modified?
4. What is the scope of psychology?
5. What are the different methods of a science?
6. What are the main defects of observation?
7. What is the method peculiar to psychology?
8. What are the methods of modern psychology? How can we establish the accuracy of facts in psychology?
9. What is the chief objection to introspection?
10. What is retrospective introspection?
11. What is the problem of psychology? How would you try to study the taste of an orange?
12. What are the different branches of psychology?
13. What do you think is the use of the study of psychology? Will it help you to understand and deal with human beings?
14. Describe three cases when a knowledge of psychology would prove of use.



## Chapter II

### THE MIND AND THE BODY

#### 1. *Mind is the mental processes*

We have defined psychology as the study of mental processes. The mind is the sum-total of these mental processes. It is not something different from the mental processes, a separate object that *has* or possesses the mental processes. Just as a chair is made up of the legs, the seat, the arms, and the back, and if we take away all of them, then no chair is left ; so we cannot properly say that the chair *has* arms, seat, legs. In the same way it is wrong to think that the mind is something like a small man inside us that possesses the various mental processes of seeing, hearing, talking, etc. If we take away the processes of seeing, hearing, thinking, feeling, remembering, wishing, etc., then no mind is left. In other words, there is no 'mind-stuff' separate from the mental processes. Hence, the mind cannot *have*, for it is the mental processes.

#### 2. *Mind is related to the body, especially to the brain*

The mind or the mental processes are always found connected to a body. The existence of a mind without any body is not accepted by modern scientists, although it is well known that a dead body does not appear to be connected with any mind. The mental processes however do not seem to be connected with every form of bodily processes. They are most intimately connected only with the brain (or cortical) processes. There are several reasons for believing in this relation. (i) The more intelligent animals have better-developed brains (Fig. 1). Let us take for instance the fish, the bird, the rat, the dog, the monkey, and man. A bird's brain is more developed than that of a fish ; a rat has a better brain than a bird ; a dog, a monkey and man have better developed brains in the

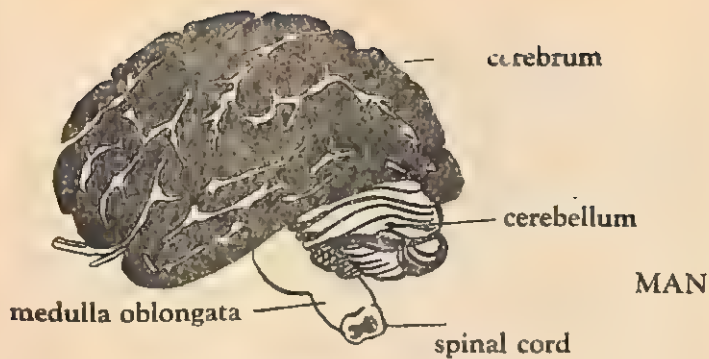


FIG. 1. The development of the brain. The size and number of convolutions of the cerebrum are in proportion to the animal's intelligence.

same order (Fig. 1). Each of them is found to be more intelligent than the animal mentioned before it, for it can learn to do more complex tasks. A man can learn more than a monkey, and a monkey more than a dog, and so on. Hence we come to believe that the development of the brain runs parallel with the development of the mind. (ii) Disease or injury to the brain often leads to disease or loss of certain mental processes. A blow upon the head, that is a strong shock to the brain, may make a man unconscious, that is bring about a temporary loss of mental processes. A tumour, or a bullet injury to some part of the brain may lead to defective vision or hearing, or paralysis of the legs, arms, etc. (iii) *Lastly the mental processes take place only when the nerves carry the impulses of the bodily changes to the brain.* If the nerves from the arm of a man are cut or otherwise destroyed, then a pin-prick in his hand does not produce (in him) the mental experience of pain. When a dentist deadens a nerve by means of a drug injection, he can pull out teeth or cut the gums of the patient without causing any pain.

### *3. Psycho-physical interaction*

We know that the mind and the body (or the brain) are intimately connected with each other. Now a question may be asked, What is the nature of this mind-body relation? In ancient philosophy this problem was described as that of psycho-physical relations.<sup>1</sup> There are two famous but mutually opposite points of view. One of them says that the mind acts upon the body, and the body also acts upon the mind. This is known as the *hypothesis of psycho-physical interaction*. This is the common-

<sup>1</sup> Because of the intimate connexion between the mental processes and the brain or nerve processes, sometimes the same problem has been described as that of psycho-physiological, psycho-cerebral or psycho-neural relationship.

sense hypothesis (and is generally associated with the name of Descartes). We know that when we are feeling very sad we may lose our appetite, and all our limbs appear to be aching and weary. Then even good food does not stimulate our appetite. Bodily comforts do not soothe our aches, or refresh our limbs. The influence of 'fear' or 'amusement' on the body is also well known. Here a mental change seems to produce a bodily change. Again, when we are very ill, music or jokes do not have the usual effect. Here, it seems, a bodily change leads to mental changes. Hence it is argued that there is a mind-body interaction.

But there is one objection : the mind is not extended in space, it cannot be measured in feet and inches ; but every bodily object is extended in space. Further the bodily changes are the results of physical energy. The mental changes must be the result of some mental energy. So it becomes impossible to imagine how the two, so different from each other, can act upon one another. Moreover this theory makes the study of physiology much more difficult. If the body is acted upon by the mind, our knowledge of the body will remain unreliable and incomplete until we have equally scientific knowledge of the mind.

#### 4. *Psycho-physical parallelism*

The second hypothesis holds that the mental processes and the bodily processes do not act upon one another. Like the points in parallel lines, they never meet. So this view is known as the view of *psycho-physical parallelism*. In other words, the two series of activities go on side by side. We think and we talk ; thinking is a mental series and talking a bodily series. Neither our 'thinking' makes us talk, nor does our 'talking' make us think. This hypothesis is convenient for the purposes of scientific study. It permits our studying physiology without wait-

ing for suitable advances in psychology, or vice versa. We study the processes of digestion without worrying about how laughter or happiness during and after meals improves digestion. It also avoids the objection of how two series of processes, so different in character, can act upon one another. However, there is also an objection to the parallelist hypothesis. There is no direct one-to-one correspondence between the two series. Two spoonfuls of sugar in a cup of tea give us a certain quantity of sweetness and pleasure; but four spoonfuls of sugar in the same cup, that is, double of the stimulus intensity, will not give us double the experience of sweetness or double the pleasure. There is no mathematical point-to-point connexion or similarity between the two series. In spite of this defect we can follow this hypothesis in studying the mental processes independently of the bodily processes. And if we do find any correspondence between the two series of processes, we shall be all the more sure of our facts.

There are two other hypotheses. One says the mind alone is active; and the second that the body alone is active. These are very extreme views, and so they are not commonly accepted.

### *5. The nervous system*

We know how the mind is specially related with the brain. So a general discussion of mental processes requires some basic knowledge of the facts about the brain or nervous processes. Again, animal behaviour implies activity and movement of the body. This movement often occurs through a change in the position of the bones. Many bones of the skeleton are connected with muscles. So the bodily movements are the results of the contraction of one or more of these muscles. These muscles can be made to contract or relax through the passing or stopping of impulses in the nerves connected with the muscles. The



nerves are connected also with each other, either directly or indirectly, through certain intermediate nerves. Thus, there is a system of these nerves which connects the various parts of the body with each other, and it is aptly described as the Central Nervous System. A child sees a toy, and his arms move towards it. This is possible, because the eyes are connected by the nerves with the brain, and through the brain with the muscles of the arm. There are millions of nerve fibres in the human body. But all of them are separate units, like the number of bricks in a wall. These nerve units are known as *neurons* (Fig. 2). It may be

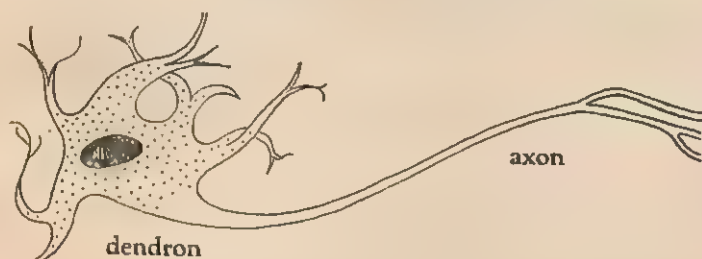


FIG. 2. A neuron. The nerve current flows from the nucleus along the axon.

noted that each neuron is connected with almost all others, either directly or indirectly. When the ends of any two neurons lie very near, then the impulses from the one may pass into the other. Such a connexion is called a *synapse* (Fig. 3). If the distance at the synapse is great, then the nerve impulse cannot pass from one neuron to the other. It should be remembered that a synapse indicates only the nearness of the ends of two neurons. It does not mean a fusion or joint, like the welded joints of some electric wires. Further, if the nerve-impulse is strong<sup>1</sup> it will jump across the synapse and excite the other neuron. But when

<sup>1</sup> If a weak impulse is repeated in quick succession then it also grows strong and can jump across the synapse.



it is not so strong, there will be no excitation of the other neuron, or action upon the parts of the body connected with the other neuron. This character of the synapse is

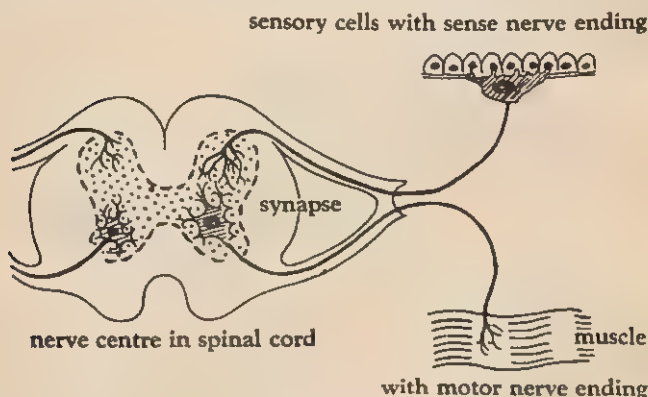


FIG. 3. Reflex arc with synapse. There is no synapse on the left where the nerve endings are not near to each other.

described by saying that the nerve-impulse follows the 'all or none' law.

It is accepted nowadays, that there is also a functional connexion between two neurons that lie side by side, or may get around together. This influence by the course of the nerve-impulse in one neuron on the activity of the other is known as *ephaptic* relation (J. C. Eccles). This relation is very similar in function to the well known synaptic connexion. (These are also called *ephapses*.)

There is another peculiarity; *the nerve-impulse always passes in a single direction*. If the impulses from the neuron A pass through the synapse to the neuron B, then the nerve-impulses can never change their direction and return through the same synapse from B to A. Further, several nerves in the nervous system have got definite and distinct functions. Some only carry impulses to the brain;

and others only carry impulses from the brain. The incoming nerves that carry impulses to the brain are usually known as *afferent nerves*, and the outgoing nerves from the brain (or central nervous system) are called *efferent nerves* (Fig. 5). It is much easier to remember them as sensory nerves, that is nerves which carry the impulses from the sense-organs; and *motor nerves*, which carry impulses to the muscles or glands. The groups of sensory nerves generally form connexions in the hind part of the central nervous system; while the motor nerves start from the front of the nervous system (Fig. 5). The nerves which simply connect one nerve centre with another may be called *connecting nerves*, or 'connecting' neurons.

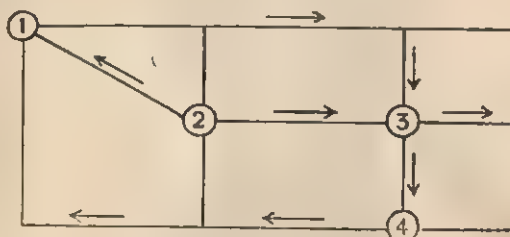


FIG. 4. Recurrent nerve circuits.

A very interesting system of nerve connexions has been found by R. Lorente de No. A number of nerve cells are so connected that the impulses which start from one cell, after one or more connexions with other neurones, return to re-excite the original cell (Fig. 4). Thus they form a definite circuit of continuing excitations. These *recurrent* nerve circuits are believed to be useful to explain memories, ideas and other complex behaviours.

The point where sensory nerves and motor nerves meet each other is known as a *centre* or nerve centre. There are three important nerve centres in the human body.

The highest and most important is known as the *cerebrum* or the brain proper (Fig. 6). It is the excitation of the cerebral centres that accompanies conscious mental activity. The cerebrum or brain is divided into two parts. The half towards the front contains the centres for motor nerves. The back-half has a sensory function. It is also divided into several parts. It has the centres for sensory nerves from the eye, ear, skin, etc. All these areas are

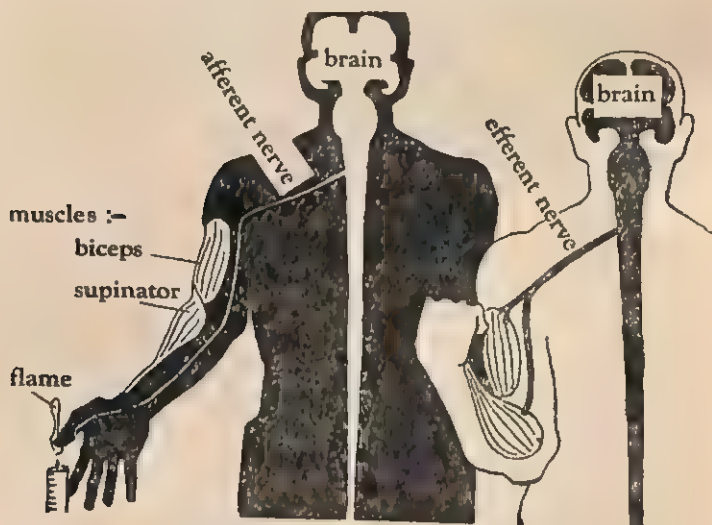


FIG. 5. The paths of the sensory or afferent nerve-impulses from the thumb, and the motor or efferent nerve-impulses to the arm-muscles.

connected by means of a large number of intermediate neurons (or connecting neurons). Immediately below the cerebrum is the *lower brain*,<sup>1</sup> which is responsible for those bodily activities which normally go on in a

<sup>1</sup> This term is being used in a topographical rather than a technical sense. Thus, it includes the cerebellum, the medulla oblongata, the thalamus, the pons, etc.

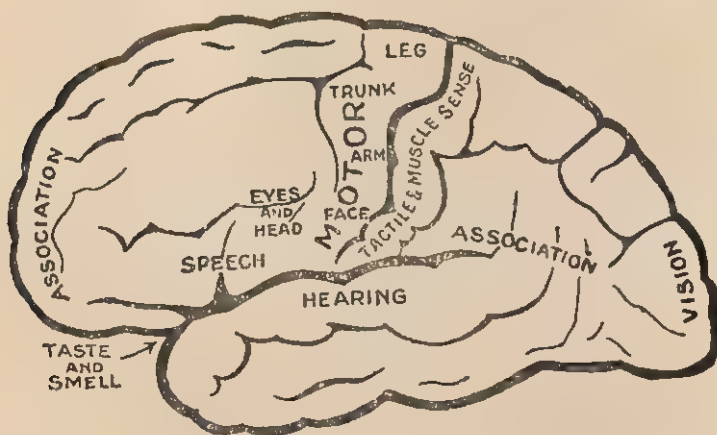
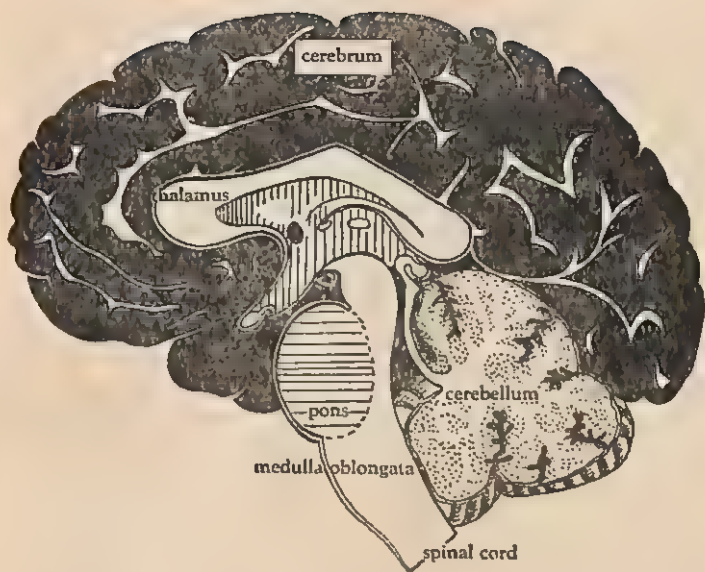


FIG. 6. The human brain



mechanical manner, namely breathing, blood-circulation, digestion, bodily posture, etc. The activities of the centres in the lower brain can be controlled to some extent by the cerebrum, for example we can stop breathing or hasten it, for some time. It also acts as a connecting station between the cerebrum and the lowest centres in the *spinal cord*. The spinal cord carries the lowest centres. The spinal centres are directly connected with the skin sense-organs, and the muscles that are used for *effecting* any bodily changes (i.e. the skeletal muscles). The spinal centres are usually connected with the cerebrum either directly, or via certain intermediate centres in the lower brain (Figs. 7, 11). These centres are generally under the control of the cerebrum, and also of the centres in the lower brain.

The synapses usually offer some resistance to the passing of the nerve impulses. This may be due to the physical distance between an axon of one neuron and the dendrons of the neighbouring one, or caused by the electrical aspects of the nerve impulse. The resistance may also be due to chemical activity in the intervening area, or due to all sorts of physical, electrical and chemical conditions. But if one synapse is used many times, then its resistance is considerably lowered. And if a synapse is not used for a long time, then the resistance is likely to increase. When a child learns to draw a straight line free hand, at first his attempts are very rough. This is so because the connexions between the various nerves concerned with the control of his movements are not well made. With practice the nerve connexions improve, that is the synaptic resistance decreases, and so the eye-centre can more easily control the fingers. But later if the child does not touch a pencil nor draw lines for a number of months, then it will lose the earlier efficiency. This happens because the synaptic resistance has increased in the meantime, and now the impulses from the eyes do

not easily pass through the synapse, nor consequently do they keep proper control over the muscles of the fingers. The resistance at a synapse can also be increased or decreased by the use of certain drugs. A little drink of tea reduces the synaptic resistance, but a dose of sleeping pills increases it. Often, this change of resistance can be brought about by nerve impulses from the cerebrum. In these cases we speak of the *inhibition*, or the *facilitation*, of nerve impulses. Inhibition means an increase in the synaptic resistance, and a prevention or checking of the activities possible through that synapse. Facilitation means a decrease of the synaptic resistance, and a strengthening or speeding up of the functions controlled by that synapse. These changes can be explained as due to altered physical, electrical or chemical conditions at the given synapses.

There are several functions of the organism which go on always, without a stop (as long as we are alive), and without our knowledge. We very seldom know anything about the circulation of our blood, or the activities of our breathing or digestion. Such processes appear to go on independently of our other engagements. We may be busy or idle, happy or sad, but our breathing and circulation processes go on unceasingly. These activities are necessary for life. These vital functions are controlled and run by a practically independent system of nerves, called the autonomic or *sympathetic nervous system* (Fig. 7). It consists of chains of 'nerve ganglions' that hang on both sides and in front of the spinal cord. The different ganglions contain nerves from different organs within the body. Each sympathetic nerve ganglion is connected by nerve processes with one segment of the spinal cord. The whole chain is connected with the lower brain. It is through these connexions that the processes of the central nervous system (the cerebrum, lower brain and spinal cord) are able to influence the sympathetic nervous

system. This influence takes the form of facilitating certain functions, and inhibiting others. This is easily

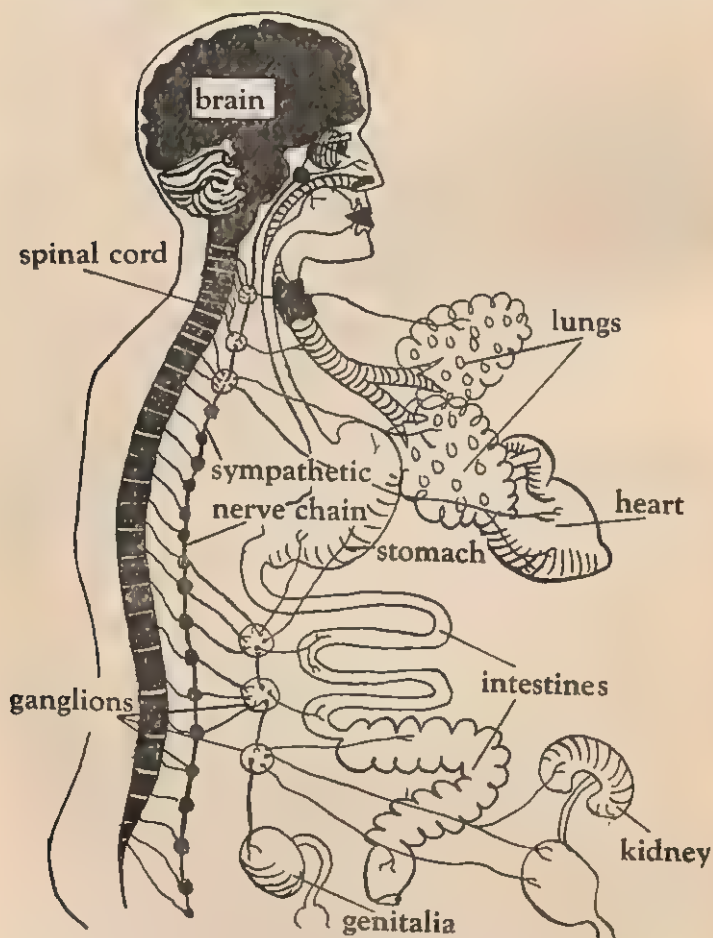


FIG. 7. The sympathetic nervous system.

noticed in the case of emotions. During anger the liver and certain glands (the adrenals) become more active, but

the stomach becomes less active. The sympathetic nervous system may be divided into two parts, that balance each other like persons on a see-saw. When the functions controlled by the one are highly facilitated, the functions controlled by the other are inhibited, and vice-versa. We need not enter into greater detail in the course of this elementary discussion.

#### 6. *Things and processes*

We have been talking about *processes*. They are to be distinguished from *things*. Things do not go on changing while you observe them, for example a table or a chair. Processes, however, are always changing, for example the current of a stream, the flame of a fire. Conscious experiences are called conscious processes, because they are always changing. Our ideas are flowing like a stream, changing from this and that to the other. Processes are usually the results of activity. Bodily processes are due to mental activity. Perhaps both these kinds of processes are the results of life activity.

Sometimes the results of mental activity are described as ideas, pleasures, wishes, and so on. Thus they seem to be stationary (or static) things with concrete and unchanging shapes or sizes. But this impression is wrong, because our ideas, pleasures, and wishes are ever-changing processes. Mental activity indeed consists of dynamic processes in a continuous flux. How can this activity be properly understood as a series of successive states or experiences? So it is nowadays considered better to describe and classify the mental experiences as the knowing, imagining, feeling, and wishing processes.

#### QUESTIONS

1. What is mind?
2. Why do you believe that mind is related with the brain?
3. What is meant by psycho-physical interaction?

4. Give two examples in which the body seems to act upon or determine the mental processes.
5. Give two examples of cases when the mental processes appear to act upon or determine the bodily processes.
6. What are the extreme views about mind-body relation?
7. What is meant by psycho-physical parallelism?
8. Give two examples of cases when the mental and the bodily processes run parallel to each other.
9. What are advantages and defects of the views of psycho-physical interaction, and parallelism?
10. What are the main centres of the nervous system?
11. Write short notes on: (a) neuron, (b) synapse, (c) sympathetic nervous system, (d) inhibition, (e) facilitation, (f) the afferent nerves, (g) the efferent nerves.
12. Distinguish between things and processes.
13. Give three examples each of things and processes.



## Chapter III

### ANALYSIS OF MENTAL PHENOMENA

#### 1. *A general analysis of the modes of consciousness*

Suppose you are listening to a class-lecture. Then the experience of a few moments may easily be as follows : You are *knowing* certain facts, which are being given in the lecture. You are also *feeling* either pleased or displeased with the lecture ; and lastly, you may *wish* that the lecturer should continue his lecture as he is now going on, or that he should change to a certain extent. In short your mental processes are those of knowing, feeling and wishing. In almost all cases of mental experience, we can find these three *modes* of consciousness, just as all physical things can be found to show length, breadth and thickness. In ancient European philosophy the above processes of knowing, feeling and wishing (or willing) were described by the Latin terms *cognition*, *affection* and *conation*, respectively.

#### 2. *The relation between the modes*<sup>1</sup>

At first sight it appears that the relations between the three modes are of a cyclic order. First there is knowing or *cognition* ; this leads to feeling or *affection* ; and lastly affection leads to willing (or acting) or *conation*. We may describe this apparent relation as cognition→affection→conation. But this is not a correct description of the facts. Although length, breadth, and thickness are always found together in physical objects, it would be foolish to say that length leads to breadth, and breadth to thickness. In the same way cognition, affection, and conation are always found together in mental experience, and it is wrong to

<sup>1</sup> This section may be studied after the first reading of the book.

say that the one leads to the other. Further, in physical objects we find some in which length seems to dominate breadth and thickness, for example in a long thistle. In the same way we find conscious experiences in which one mode is more prominent than the others. When we are solving a slightly difficult problem in geometry or logic, the dominant mode is that of knowing or cognition. The *pleasure* of solving, and the *wish* to solve other problems seem to be subordinate to cognition. When you are playing hockey or badminton the mode of acting or conation seems to dominate the knowing of the game, and the feeling for its progress. When young people are happily talking and laughing together, then the mode of feeling or affection is dominant. The knowledge of the nature of the jokes and the wishes to continue are in the background. Thus we may conclude that it is wrong to say that one mode of consciousness is the cause of another ( $a \rightarrow b \rightarrow c \rightarrow a$ ); rather all the three modes, in varying degrees, are always found together in each moment of the stream of our mental experience ( $Da + \Delta b + \S c$ ). The mental experience at any moment was described by older psychologists as a *psychosis*. In modern times an equal emphasis is laid upon the facts of bodily processes that are also going on in the individual. These would include a complex intermixed stream of continuous processes among the nerves and muscles, as well as blood circulation and glands, or the subtle processes of metabolic functions. They appear as postures and movements of the individual at any moment.

However, just as in physical objects we cannot measure all the three dimensions at once, but have to pass from the observation of one, say length, to the other, breadth, and then to the third, thickness. So in the study of mental processes it is convenient to study the modes of conscious experience separately. But we must always keep in mind that such a separation is made simply for the convenience

of study. Further, we must remember that no such separation is possible in the mental life. In the case of physical objects, in actual life we cannot have simply breadth or thickness, without any length, because the three are inseparable ; and so is the case with conscious experience. We never have a process of knowing only, it is always mixed with some more or less vague feelings ; and connected with some more or less definite wishings or actions. Again, we never experience a bare feeling ; it is always expressed on the background of some knowings or wishings. In the same way, there is no experience of mere wishing ; each desire, however vague, refers to some knowing of objects as means or ends to action, and of some feeling, however weak or ill-formed it may be. The modes are actually inseparable, although in theory we can distinguish them from one another. Each momentary experience has arisen from an earlier series of experience and continues to flow and develop into new experiences. The stream of earlier causes and later consequences is inseparable from the experience of the present instant. However, for our convenience in understanding and explaining the same, we distinguish each behaviour into its earlier and later phases. Exactly so we often find it convenient to talk about the inseparables of physical length, breadth, and thickness as distinct dimensions. In the same way, the psychologists consider it convenient to talk about the modes of cognition, affection and conation and we shall discuss them in different chapters.

### QUESTIONS

1. What are the modes of consciousness ?
2. Give two examples from your own experience of a music party and a debate, describing the various modes of your consciousness.
3. What is the common-sense opinion about the relation between the modes of consciousness ?

4. What is the correct view about the relation between the modes of consciousness?

5. Give two examples each, from your own experience, to show the importance of (a) cognition, (b) affection and (c) conation.

## Chapter IV

### SENSATIONS

#### 1. Sensations

We shall first of all take into consideration the cognitive or 'knowing' aspect of mental experience. All knowledge of the world is ultimately obtained through sensory experiences. We mostly see, hear, and touch the objects in this world. Seeing, hearing, touching, etc. are different kinds of mental experience that accompany an activity of the eyes, ears, and skin, which are sense-organs. The mental experiences connected with their activity are known as sensory experiences. There would be little direct knowledge of the world in the absence of the processes of seeing, hearing, touching, etc. Hence we can say that the sensory experiences are fundamental *processes of cognition*. Much of our adult knowledge is fairly complex. Words like 'door', 'roof', 'mango', 'dog' have meanings for us far different from what they have for a small child. But our present knowledge is certainly a growth, and a development of the scraps of our childhood's knowing processes. To a small baby a door and a roof are not very different objects of visual experience; a mango is perhaps a vague *mixture*<sup>1</sup> or blend of a seeing and a tasting; and a dog another mixture of a seeing and a hearing. Gradually the character and the use of the door

<sup>1</sup> This MIXTURE is of a unique nature. The result is different from a simple sum-total of the parts; it also carries within itself all of its parts in an inseparable manner. For instance, the child sees a mango, then touches it and tastes it. His final experience is not merely the sum of the processes of seeing, touching and tasting. It is a knowledge of the mango, and this knowledge is a process which contains within itself all the various seeing, touching and tasting processes. Each process is modified by the previous experiences. The taste sensations are coloured and enriched by the form, hues and the touch, warmth and pressure of the earlier experience. The sensation of sweet or sour is inseparable from the total experience. It also goes to modify the earlier mass of knowledge



and roof come to be known by the child. He learns the meanings of objects. The infant's knowledge is a relatively simple mixing up of a few sensory experiences. The young man's knowledge of the same objects is a much more complex meaningful experience. A dog is not merely a white, or red, or black animal, it is now more clearly known as a loyal friend or a dangerous enemy. Meaningful knowledge grows with the development of the individual. In each case this sensory knowledge is added to his earlier experiences of seeing, hearing and touching, etc. It is clear that the wonderful growth of human knowledge is ultimately based upon the foundation of the simpler sensory experiences. So they form the fundamental processes of cognition.

Every complex experience of knowing an object, say the tasting of tea, may be analysed into several elementary sensations of taste, smell, temperature, pressure, and so on. A *sensation* is theoretically an *elementary cognitive experience*. A pure sensation is the bare awareness or apprehension of a sensory quality, e.g. a brightness, a colour, a touch or a smell. But the experience of a single pure sensation is practically impossible, for the excitation of one brain cell leads to the excitation of several others. Theoretically, however, elementary cognitive experiences may well be described as sensations. [So the actual *concrete* experience may be theoretically described as a group or cluster of elementary sensations, and other kinds of elementary conscious processes (feeling, etc.). For example, the concrete experience of the taste of tea is made up of several elementary sensations of touch, temperature, taste, smell, etc.; and a number of feelings and wishings may be present also.] The momentary cross-section of the total mental experience is known as a *psychosis*. A complex concrete mental experience may be split through introspection into several different moments or psychoses. Each psychosis however would

have some pattern of elementary sensations in a varying ground of feeling or wish intensities.

## 2. *The classification of sensations*

We find there is a considerable parallelism between the sensations and the sense-organs. So the easiest method to classification follows the order of their presence in the body. If there are distinct sense-organs, then it follows there must be distinct sensory experiences. On the other hand, if we claim special sensory experiences, then we can be certain only if we discover certain specific corresponding sense-organs, or peculiar functions of the sense-organs. So we may classify the more important sensations by reference to the sense-organs<sup>1</sup> as follows :

- (1) The visual sensations from the eyes.
- (2) The hearing sensations from the ears.
- (3) The taste sensations from the tongue.
- (4) The smell sensations from the nose.
- (5) The touch sensations from the skin.
- (6) The muscle sensations from the muscles.
- (7) The organic sensations from organs within the body.
- (8) The equilibrium sensations from the shake-organs inside the ears.

## 3. *The sense-organs*

<sup>1</sup> The sense-organs are special parts of an organism. They are so developed as to be best fitted to receive impressions from certain definite types of stimuli, e.g. the eyes can receive impressions from light-rays within certain limits of wave-lengths. The ear is not impressed by the light rays, but is able to receive impressions from air-waves within certain limits of wave-length. The other sense-organs also specialize in their tasks. Some of the sense-

<sup>1</sup> A far longer list can be seen in C. J. Herrick's INTRODUCTION TO NEUROLOGY.

organs are so different in external structure that they can be easily distinguished by ordinary observation, e.g. the eye, ear, nose, tongue, skin. But these external parts are not really responsible for sending the nerve-impulses to the brain. These outer parts merely help in collecting together the stimulus, or protecting the really sensitive *inner body-cells*. The sensitive body-cells are the essential part of the sense-organs. In a very real sense, they are the sense-organs. For it is these cells that change the physical or chemical stimulus into nerve-impulses which run towards the central nervous system, or the brain. In the course of our discussions we will find that the real sense-cells, in the case of the eye, are the rods and cones in the retina, and in the ear, the hair-cells inside the cochlea. Further, what appears from the outside as the same organ may give different sensations, because of differences in its sense-cells. The skin gives out impulses which are accompanied by touch-, temperature- and pain-sensations. The skin has under it a variety of sense-cells, that differ in their structure, as well as in their function. In each case, the sense-cells or the sense-organ is connected by means of a special nerve path with its special part in the lower brain, and the cerebrum.

#### *4. The eye and the visual sensations*

The sense-cells of the eye are specially sensitive to the stimulus of physical light-rays which reach the sense-cells after being reflected from the surfaces of visible objects.

The eye is a very complex sense-organ (Fig. 8). The outer portion, which can be seen and touched from the outside, is hard and transparent (cornea). Behind it is a circular coloured muscle (iris). This gives the peculiar colour to one's eyes, and may be dark brown, blue, grey, etc. In the centre of the iris is a small hole (the pupillary hole). The expansion or contraction of the iris can

decrease or increase the size of this hole, and thus reduce or increase the amount of light that can pass within the eyes. Just behind the pupil is a transparent lens. This can alter its own shape and thus focus, from various distances, the incoming light-rays on to the sensitive part of the eye (the retina). The retina is made up of millions of light-sensitive rods and cones. The cones are known to be active during colour vision, and the rods during brightness or white-grey-black vision. The orb of the eye is filled with a liquid (or humours). This enables the eye to maintain its spherical shape, in spite of physical shocks received during movements of the head.

The eye can be fairly compared with a photographic camera. The iris acts as the diaphragm. The self-focussing lens is far superior to the adjustment of the camera's focus. The retina is something like the light-sensitive film. But it is superior in remaining ever-ready, and requiring no change.

The activity of the sensitive cells of the retina is responsible for our experience of visual sensations. They are of two kinds, and each kind respectively aids us in the seeing of (i) colours and (ii) brightnesses or colourless sensations. The sensitive cells of the retina are also of two kinds; the *cones* and the *rods*. The cones are sensitive to coloured lights, or colour wave-lengths. The rods give us the appreciation of brightnesses or colourless sensations. The cones also require better illumination, or daylight intensity, to distinguish efficiently the various colour stimuli. The rods are more efficient in weaker illumination; we depend upon their sensitivity during twilight or starlight.

It seems that the eye can see a very large variety of colours. But most colour-sensations can be easily produced by the mixture of two or three pure colours; rather light-rays corresponding to the reflections from the object-surfaces that give rise to simple sensory experiences of

colour. These sensations of pure colours are very simple. They do not seem to be obtained by the mixing of other colour-sensations. These simple sensations of colour are sometimes known as primary colour-sensations, and the corresponding stimuli are known as *primary colours*. Others describe them as elementary. These elementary colour-sensations are the experiences of pure red, yellow, green and blue. The mixture of the light-rays for some colours gives an intermediate colour, e.g., red+yellow =orange. But the mixture of certain pairs of colour stimuli leads to a colourless or brightness sensation, e.g. yellow+blue=grey. So these latter pairs are known as *complementary colours*.

A very curious result is obtained by the mixture of red and green rays. This mixture gives us the yellow sensation.

The colourless sensations form a separate series from *white*, through the grey tints and shades, to *black*. The colour stimuli also lose their distinctions when the illumination is very poor. By starlight most of the intense colours appear as black, and the bright lightly coloured objects appear as white or dull grey. In faint light our eyes are able to see only a colourless world. The sensitivity of the eyes in the dark is reduced to the level of ordinary black and white photographic films.

If the rays of the sun are made to pass through a prism they split into many colours, called the *spectrum*. When we compare colours we take the spectrum as our standard. Yellow is the brightest of all the colours. The longest rays give us red, and the shortest rays give us blue (and violet) sensations.

The nerve-fibres from the millions of rods and cones in the retina form a bundle (the optic nerve). This bundle cuts through the retina near the centre on the nasal side. If any light-rays fall here then there are no visual sensations, so this place in the retina is known as the *blind spot*. Very near to it is a small depression in the retina,



known as the fovea or the *yellow spot*. This spot is full of cones only, so when the light-rays from any object fall here, we enjoy the clearest vision. And if the light-rays

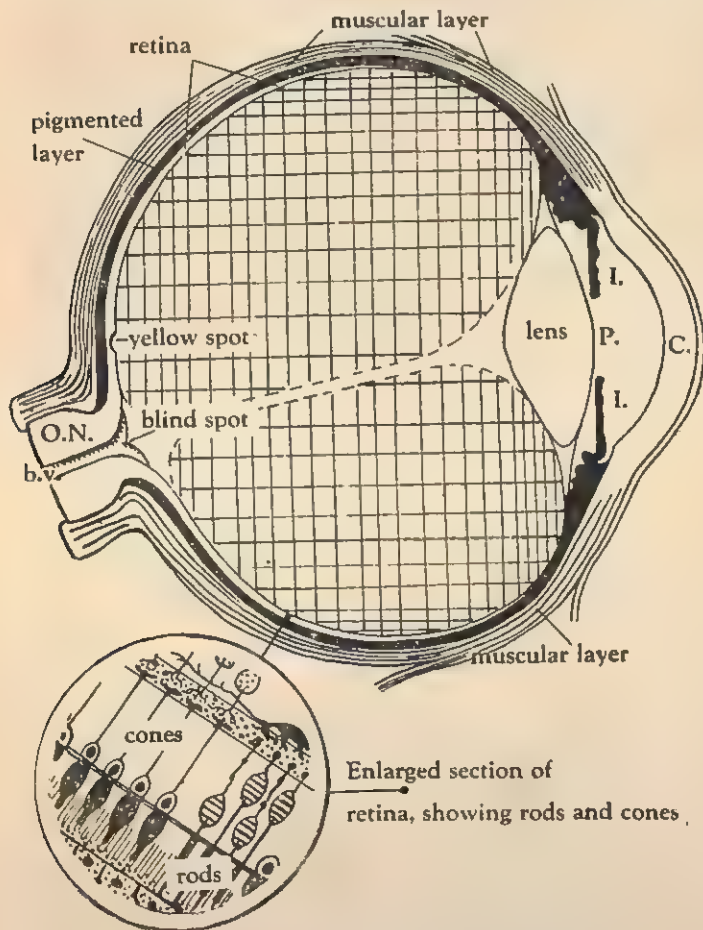


FIG. 8. The eye, with an enlarged section of the retina. C., cornea, I., iris, P., pupil, O.N., optic nerve, b.v., blood vessels.

fall on some other part of the retina, there is always a tendency to move the eye-balls so as to focus the light-rays upon the yellow spot (fovea).

As we pass from the central part to the extremes of the retina we find more and more of the rod-cells, till towards the extremities we find no cones but only rods. A most interesting fact is that light-rays falling on *the extreme outside areas* give us *colourless*, white-grey-black, sensations only. There is an *intermediate area*, containing both rods and cones, which can give us sensations of blue, yellow, and the greys only. In the intermediate area we have no cone-cells with efficient processes for distinguishing red or green. The central part helps us in seeing all the colours. In the fovea, we cannot have any grey sensations, but we have the clearest colour sensations. A patch of red, if moved away from the central field of an eye, while the eye is kept in a constant position, appears first as yellow and then as a colourless grey patch. The change corresponds to the position of the image on the retina. Thus the retina is divided into three zones (Fig. 9).

Here we may also point out that all colour sensations are more or less mixed with brightness. We can have pure brightness sensations, but it seems impossible to get a pure colour sensation that is unmixed with brightness. Because of an organic defect, some men are totally or partially colour-blind.

When the two eyes work together upon the same field of objects, they enable us to know the third dimension, i.e. depth or *distance*. The two images, on the two retinae, are slightly different. Their nerve processes are combined together by the activity of the nerve centres in the brain and the result is the knowledge of a solid object, that is an object with a depth or thickness. This is easily demonstrated by the use of a stereoscope, so it is sometimes described as stereoscopic vision or two-eye (i.e. binocular) or solidity vision.

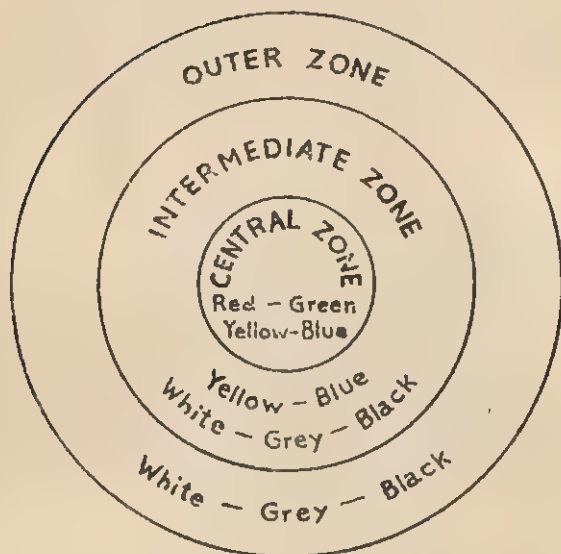


FIG. 9. The zones of the retina.

### 5. *The after-sensations*

When the retina is stimulated, the nerve excitations continue for some time even after the light-stimulus is withdrawn. The mental experience during this period is for a fraction of a second of the same quality as the original experience. This is the reason why we are able to see a circle of light when a glowing match-stick is revolved with considerable speed. But very soon, especially if you have been looking at the coloured object for half a minute or so, mental experience becomes of a quality which is the *complementary* of the original sensory experience. If the original sensation is blue, the after-image is yellow and vice versa. Because these experiences follow the retinal excitation after the withdrawal of the

stimulus, they are described as *after-sensations*. The after-sensations are called *positive* if they are of the same quality as the original. But when they are of the opposite or complementary quality, they are called *negative*. If you look at a small yellow square for about thirty seconds, and then look at the centre of a small black cross drawn with thin lines on a white or grey background, you see a blue square for a few seconds. The size of the blue square changes with the distance of the cross from our eyes. Thus, the after-sensations seem to depend upon the local retinal excitation.

An interesting effect, fairly similar to the phenomena of after-sensations, is noticed in *colour-contrast*. If a piece of grey paper is placed over a larger patch of coloured, or white, or black paper, and both covered by a thin transparent tissue paper, the grey paper appears to take on the complementary colour of the larger patch. On a blue patch, the contrast effect is yellow, but on a yellow patch, the contrast effect is blue. Again, on a white patch, the contrast effect is black ; while on a black patch, it is white.

Sometimes this colour contrast effect is known as *simultaneous contrast* ; while the contrast effect noticeable in negative after-sensations is described as *successive contrast*.

## 6. The ear and the auditory sensations

The sense-cells of the ear are specially sensitive to physical sound vibrations or waves. Sound waves arise when any vibrating object is able to pass on its vibrations to air particles near it. The sound waves travel from one point to another through the vibrations of air particles, or particles of other solid media. Sound vibrations mainly arise in two ways, for example, (1) we may blow across the open-mouth of a bottle, and get the sound of a regular musical note. The air waves blown by our mouth strike

against the sides of the mouth of the bottle, and this gives rise to vibrations among the air-particles both inside and outside the bottle. When the vibrations reach a certain degree, the sense-cells of the ears are excited, and we hear a sound ; and (2) we may strike two solid objects together. This forcible contact will cause the particles of the two to vibrate. The transference of these vibrations through the surrounding air particles to our ears will give rise to irregular experiences of sound or noises. Such noises rise with a sudden intensity and then fall off in an irregular manner as the vibrating particles resume their normal condition.

The physical ear can be easily divided into three parts, the outer, the middle and the inner ear (Fig. 10). The *outer* ear is visible to everybody, it acts as a collector of the sound-waves or air-vibrations. Within the outer ear is a small canal, usually filled with a kind of wax, which ends in a thin muscle tissue called the ear drum or the tympanic membrane. The layer of wax acts as a shock-absorber to the incoming sound-waves. The impulses of the air-vibrations are thus brought into gentle and harmless contact with the tympanic membrane. The inner side of the ear-drum is also connected by means of three bones (*middle ear*) with a small window of another membrane covering a long channel in the inner ear. The bones with their connexions form the middle ear. They are so arranged that the tympanic vibrations are magnified about thirty times and then passed on to the *inner ear* (or *cochlea*). The inner ear consists of a canal twisted in a spiral ; the canal is full of a salty liquid, and contains a thin bone supporting a membrane (*basilar*) from which spring several thousand hairs. These hairs are connected with nerve-cells and excite impulses corresponding to the vibrations received from the middle ear through the liquid in the cochlea. The hairs (or *hair-cells*) differ in length and thickness. Thus they appear to be separately



tuned to receive particular kinds of vibrations only. In other words they *analyse* the total sound stimulus, and

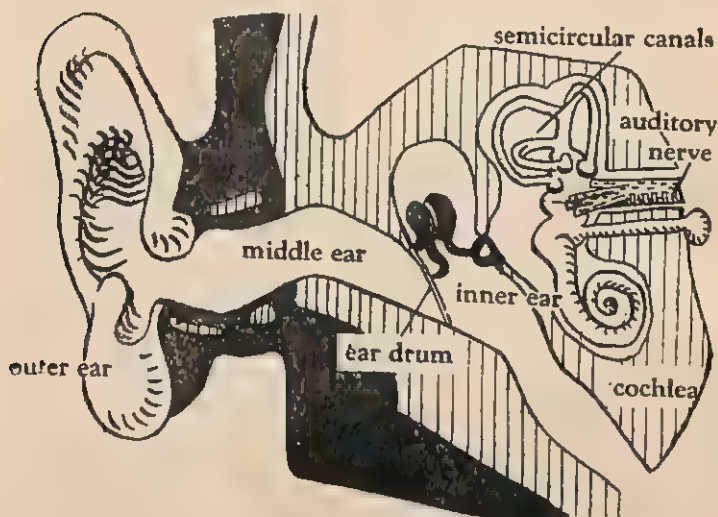


FIG. 10. The ear.

send their separate impulses to the hearing part of the brain (in the *temporal lobe*).

The impulses of the cochlea nerve are accompanied by hearing processes. The auditory sensations are usually of two types, (i) the tones, and (ii) the noises. The *tone* is smooth, regular, and rhythmic. The *noise* is irregular and rhythmic. Human speech is usually a mixture of tones and noises.

The tones are usually accompanied by a number of other tones, with double or more times the vibrations per second of the given tone. The given tone is called the main or 'fundamental' tone. The tones that accompany

the given tone are known as *overtones*. In actual experience a pure tone is extremely rare. It is usually accompanied by a peculiar pattern of overtones. Thus if you strike a note C (सा) on a sitar, a violin, or a harmonium, you can distinguish each instrument on the basis of the note's pattern of overtones. This pattern of overtones is called the *timbre* of an instrument. We can easily appreciate the character of overtones and timbre if we ask a number of persons to sing a certain line of verse. The fundamental tones and their pattern are the same in each case. But the pattern of overtones, accompanying the said fundamental tones, differ. This is so, because the structure and form of jaws, teeth, palate and nasal cavities differ in the case of each individual. These peculiarities of structure permit the rejection of some overtones and the production of others. When we recognize a voice as belonging to A, and not to B, we do so because of differences among the timbre of the speech organs of the two persons.

#### 7. *The shake-organ and the equilibrium-sensations*

Very near to the cochlea, and connected with its base, are three *semicircular canals*, connected together so that each canal is in one plane (Fig. 10). These canals are also full of liquid, and they contain various hair-cells. In some places a number of hair-cells unite together in a matted bunch and support a small stone (or *otolith*). The movements of the head produce a movement in the liquid of one or more of the semicircular canals. The current thus formed bends the hair-cells, and they send impulses through the equilibrium nerve (or the *vestibular nerve*) to the lower brain (cerebellum). The movements of the head also bring about changes in the position of the otoliths, which give rise to impulses in the matted hair-cells, and these also go through the vestibular nerve. The cerebellum-centres help us to maintain our posture ;

and if we unbalance ourselves, they help us to regain our equilibrium.<sup>1</sup>

The sensation peculiar to the loss of equilibrium is known as *dizziness*. If we go on turning round and round in the same direction, there is an overstimulation of the hair-cells in the shake-organ, and there is the experience of dizziness. This may also be brought about by a sharp heavy blow upon the ear. These sense processes may be very pleasant to children, but to adults they are sometimes unpleasant, and often accompanied by nausea and vomiting. If the stimulation of certain hair-cells is not very intense, and is kept up for a long period, we get used to it, and neglect the faint sensations. If we are sitting in a smooth, but fast moving train or motor car, we forget the sensations coming from the stimulation of the hair-cells in the semicircular canal corresponding to the forward plane. But if the train reduces speed, we become aware of this change, as this gives us a change in the given equilibrium sensations.

#### 8. *The skin-organs and their sensations*

The skin seems to be the same all over the body, but for the presence of hair at some places. However, if you experiment you will find that there are certain points where the skin is highly sensitive to touch, pain, hot, cold, or light pressure stimuli. If you touch a cold-sensitive spot even with a slightly warm metal point, the nerve processes being specialized, the corresponding experience is a cold sensation. When bathing in winter, we commonly experience a cold sensation at some points on the body after pouring a jug of hot water over ourselves. It is found that the nerves from these various sensitive spots in the

<sup>1</sup> An interesting experiment was performed with a fish. The otolith was removed and replaced by a small piece of iron. When the wound healed, the fish could be made to swim in any direction (and upside down) by the use of an iron magnet.

skin go by separate paths in the spinal cord to their special terminal centres in the brain (Fig. 11).

The skin therefore gives rise to sensations of touch, pressure, pain, and temperature (or heat and cold). The warm sensation is the result of a mixture of processes that take place when both cold and hot spots are excited together. The forefinger tip has very sensitive touch spots. The cornea of the eye is full of pain spots only. The tip of the nose has very sensitive pressure spots. The lips and the cheeks have large clusters of hot spots. Large tracts of cold spots are found at the back, just below the shoulder-blades. Otherwise the different sensitive spots are scattered all over the body. The *hairs* are simply magnifiers of the pressure stimulus. The weight of an ant or a fly is not noticed on the skin, but when it sits upon a hair, the weight is immediately noticed.

### 9. *The tongue and the taste-sensations*

The tongue is usually kept moist by the activity of a number of salivary glands. The skin of the tongue, like the outer skin of the body, has a large number of touch, temperature, pressure and pain spots.

The surface of the tongue is also penetrated by a number of minute pores or vertical canals. If any liquid goes down these canals it comes in touch with hair-cells. These hairs grow out of small taste-buds (*papillæ*); and are connected by nerves with the taste part of the brain. When the salivary liquid, mixed with some chemical particles of the object on the tongue, enters the pores it produces chemical action on the hair-cells of the taste-buds. Some of these hair-cells get excited and send out impulses. Some taste-buds are impressed by only one kind of chemical solution, but there are others that can respond to two or three types of substances. In children there are active taste-buds in the cheeks also. These begin to lose their sensitivity in adults.

The tip of the tongue is specially sensitive to sweet and salt stimuli, the sides to salt and sour, and the base of the

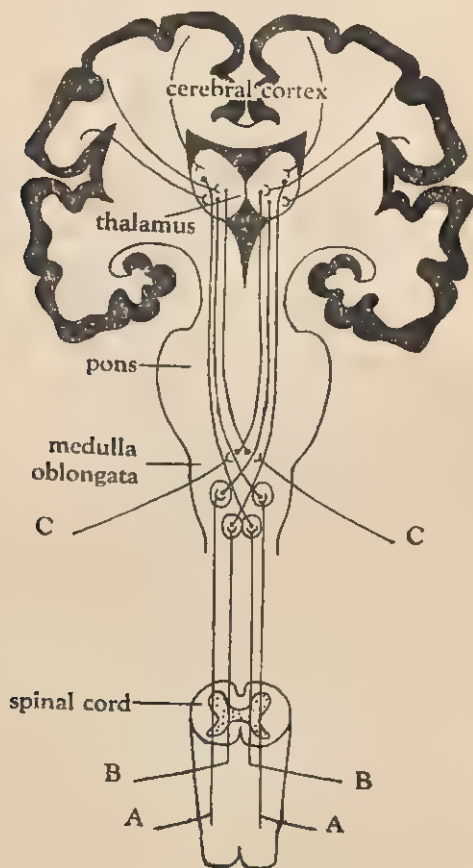


FIG. 11. Afferent nerves from sense-organs in the skin. Imagine that lines marked A are nerves carrying heat-sensations; B, nerves carrying cold-sensations; and C, nerves carrying touch-sensations.

tongue to bitter substances. The central part is relatively less sensitive.

The various taste-experiences are usually mixed with smell-processes. It is well known that a man with a bad cold, suffers from a congestion of the nose passages. He is not a good judge of tastes because of a disturbance of the smell processes. Indeed, if the smell-processes are eliminated, then the tastes of quinine and coffee, or apple-juice and onion-juice cannot be distinguished by the average man. Most taste-experiences are also mixtures of various taste-sensations; e.g. the taste of tea is a mixture of sweet and bitter tastes and other smell- and skin-sensations. There are only four pure taste-sensations. These are: (i) sweet, (ii) salt, (iii) sour, and (iv) bitter.

#### 10. *The nose and the smell-sensations*

The outer nose is simply a passage for chemical particles carried by the air. Inside the nose, towards the top is the smell-area. Here are a number of hair-cells almost immersed under a moist surface. These are excited by contact with very minute chemical particles. The elementary smells are not agreed upon among the various authorities. However, the following groups are well known: (i) the fragrant, (ii) the ethereal, (iii) the resinous, (iv) the fruity, (v) the burnt, and (vi) the putrid. Some smells combine with others; but some conflict and cancel the experience of others.

#### 11. *The muscles (or motor organs) and the movement-sensations*

To understand a movement let us suppose there are two bones, the end of one is fitted with the socket at the end of the other (J). Both bones are connected to each other by means of tendons (T) of a group of muscles (M). The bones are thus kept at the position  $P_1$  (Fig. 12). Now if the muscle contracts (to the size shown), it pulls at the tendons, and the bone moves up through the socket joint up to the position  $P_2$ . This also means a



change in the position of the two bones at the joint (J). In the case of a relaxation of the said muscle, the bone would slip down from the position  $P_2$ . It would move towards the position  $P_1$ . Often there is another set of tendons and muscles connected on the other side. And a contraction of the muscle that pulls the bone up, occurs at the same time with the relaxation of the other antagonistic muscle. Thus the activity of the two muscles at any moment shows the proportion of contraction in one and relaxation of the other. This joint activity of the set of two antagonistic muscles determines the position of the said bones at the given joint.

Now there are sense-cells in the muscle (M), in the tendons (T) that join the muscle with the bones, and in all the surfaces of the joint (J). Hence any movement gives rise to sensory excitations from the muscles, the tendons, and the joints. Thus the total of muscle-joint-tendon-excitations may be described as movement (or motor) excitations. And these are often noted as sensations of movement (or motor sensations) or *kinæsthetic sensations*.

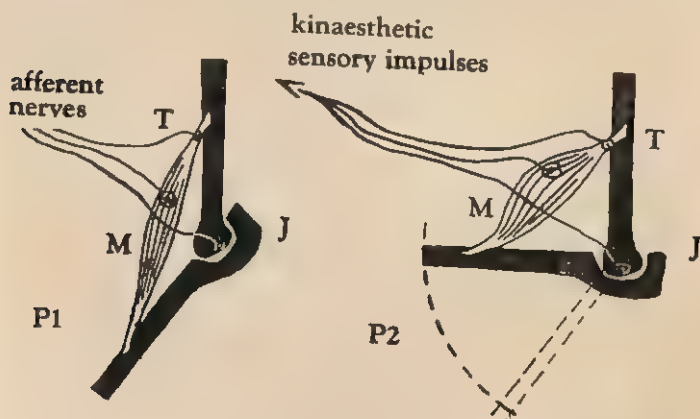


FIG. 12. Bone and muscle changes during movement.

Apart from taking part in movement-processes, the muscles, joints, and the tendons also give occasions for various special sensations. The muscles give rise to deep *pressure* and *deep pain*. Excessive use of the muscles leads to the sensation of *fatigue*. The tendons give us sensations of *strain*. The joints give us sensations of *position* and of *strain*.

## 12. The organic sensations

The most important organic sensations are gained from sensory processes arising from different parts of the *palate* of the mouth, the food-pipe, and the stomach. The dryness of the surface of the palate (also the lips) leads to *thirst* sensations. A pressure or excitation at the upper end of the food-pipe gives rise to *nausea* sensations. The contraction of the stomach-walls beyond certain limits gives rise to *hunger-pangs*.

The pressure of air in the lungs is noticed as the *bracing* sensation. This is also experienced when the air that we breathe has a richer content of oxygen, e.g. during walks in the early morning, or on hills or after a shower of rain. Chemical impurities or a great reduction of the air quantity in the lungs are known as *choking* and *stuffy* sensations. The rapid movements of blood in the veins are accompanied by *tingling* sensations. Sometimes certain chemical or physical conditions within the body are felt as *organic ache* sensations, e.g. colic pain, or headache. The fulness of the bladder is responsible for a peculiarly painful sensation. When the full bladder is evacuated by passing urine, there is an experience of relief. This is a consequence of the relaxation of the painful pressure against the muscular walls of the bladder. Visceral sensations<sup>1</sup> are often mixed up with muscular and tactual

<sup>1</sup> The soft internal organs of the body, such as the stomach, lungs, liver and heart, are known as the *viscera*. So the sensations from them are sometimes known as *visceral sensations*.

sensations. The sex-organs, when tensed with the changes in the flow of blood to their muscles, give rise to peculiar sex-sensations of lust. Some think these sensations are not pure or simple, but mixtures of tactual, muscular, and visceral sensations.

### 13. General characteristics of sensations

(i) The sensations are experienced only when the impulses from the sense-organs are carried by the nerves (sensory) to the cerebral cortex, and produce an excitation of the special centres there. So *all sensory processes are always connected with an excitation of the sense-organs* on the surface of the body or within the body, e.g. the skin sense-organs ; the muscle sense-organs, etc.

(ii) The above fact leads to the characteristic of *quality*. Every sensation has some quality, e.g. white or black ; hard or soft ; sweet or salt ; fragrant or putrid. A sensation without any quality cannot be experienced ; (although the sensory processes may be so strange in quality that they cannot be properly described).

(iii) Every sensation has some *extensity*. It is evident that visual and touch-experiences always have some extensity. Even a point of light, or the touch of a pin has a noticeable extension. The taste-experiences are bound to have it because of their mixture with touch-processes from the tongue ; the smells have a *volume* ; the sounds also. This characteristic of volume is similar to extensity in their case.

(iv) All sensations have a certain degree of *intensity*. Unless the intensity is noticeable there can be no sensory experience. If the process has very little or practically no intensity, the sensation is not noticed. The buzzing of a mosquito at a yard's distance is not noticed, neither is the pressure of a speck of dust that settles on our collar. A sound-sensation depends upon a certain intensity of the

hearing process ; a pressure-sensation depends upon a certain intensity of the weighing process.

(v) All sensory processes must be experienced for some time. They must be of some *duration*. The flash of a light must continue for some time if it is to be noticed at all. The spokes of a rapidly moving wheel are not observed, because the duration of their several visual processes are below the noticeable limit.

(vi) All sensory processes must have some *stimulus*. Sensations depend upon the excitation of the sense-organs, which in turn depends upon its excitation by some stimulus. For instance, the visual experience depends upon the excitation of the eye (specially the retina) by a ray of light reflected from an object, e.g. a book or table. Further, all the characteristics of the sensory processes are also to be noticed in the stimulation of the sense-organs. The stimulus also must have a noticeable quality, intensity, extensity, and duration. The mental (sensory) processes run parallel to the bodily (sense-organic) processes, and the student must keep in mind that the two are very different from each other. The stimulus of a red paper-bound book, say  $5'' \times 3'' \times \frac{1}{2}''$ , is very different from the corresponding sensory experience of the book. The stimulus book is a thing—a part of the physical world. The sensory experience of that book is a mental process. The physical book may be destroyed or lost, but the mental process of the same book may be recalled almost unchanged after ten years. And the form, colour or size of the said work may be judged as good or bad and the total experience remembered as pleasant or unpleasant.

#### 14. *The quantity of sensations*

The accuracy of a science, especially an experimental science, seems to depend upon its ability to measure its subject-matter. So in 1879 when the first laboratory of

Experimental Psychology was started at Leipzig (Germany), laborious methods were tried for the measuring of sensations. At first they tried to find *middle* pressures or sounds between two given pressures or sounds. But the results were not reliable. Then a method of finding the 'just noticeable differences' (or least *noticeable* differences) was developed. It was soon found that the various sense-organs had different dimensions of their least noticeable differences, especially when the corresponding stimuli were compared. For instance, a light of 50 candle power is noticeably increased by the addition of only 1 candle power; but a pressure of 16 oz. is not noticeably increased by the addition of less than a single ounce. Further it was found that the stimulus-intensity in each sense-organ bears a definite ratio to its sensitivity. For example, if a man can distinguish between the light intensity of 50 and 51 candle powers, then, given a light of 500 candle power, he will be able to distinguish it from 510 candle power, but not from 505 candle power or 495 candle power.

The relation between the differences in stimulus intensity necessary to bring about an appreciation of just noticeable differences in the intensity of sensations is known as *Weber's Law* (or the Weber-Fechner Law). In simple words it means that an increase in sensation-intensity has a definite relation with the increase in the stimulus-intensity. Further if the sensation ( $S$ ) increases in arithmetical ratio, e.g.  $S, S+d, S+2d, S+3d$ , etc., then the stimulus ( $s$ ) increases in geometrical ratio, e.g.  $s, sr, sr^2, sr^3$ , etc. The mathematical relation between the two series is known as Weber's Law ( $S=C \log R$ ; where  $C$  is a variable constant). It refers to a constant, but this figure varies for the different sense experiences. The  $C$  for visual experiences is very different from the  $C$  for auditory or tactile experiences. Weber's Law is not now held in very

high respect as it is found to be true within only a limited range of middle sensation-intensities.

### 15. Images

Whenever we experience a sensation there is the excitation of the sense-organs. And there is also the excitation of a particular part of the brain cortex. It is this excitation of the brain which is accompanied by the mental experience of a sensation. This excitation of the brain through the sense-organs may be described as an *external excitation*. But if there be an excitation of the same part of the brain *without* any excitation of the sense-organs, then this excitation may be called *internal excitation*. The mental experience that accompanies such an internal excitation of the brain may be called an *image*, for it is a copy of the externally excited experience of sensation. (We shall discuss images in detail in Chapter IX.) Images are sometimes called *reproduced sensations* or *representative mental processes*. Images are usually less vivid and intense than the corresponding sensations. The image of the taste of a mango, the smell of a flower, or the images of sight or touch of a friend, are usually but poor substitutes for the original sensory experiences. The sensation has the striking quality of stimulating us on behalf of the object. An image seems to come from within, it has all the smoothness and intimacy of a subjective experience. It has no direct, pointed objectivity, or the sharpness of the reference to the object present in a sensation.

Images can mix with sensations. For instance, I see a man, and know him to be a friend, Mr A. B. by name. My total perception is made up of many visual sensations of shape and distance, and the images of his name, and his past friendly actions. The mixture of sensations and images, has all the properties peculiar to a blend of sensations,



## QUESTIONS AND EXPERIMENTS

1. Why is it said that sensory experiences are the fundamental processes of cognition?

2. What are the general characteristics of sensations?

3. What are the peculiar qualities of a mixture of sensations?

4. Give three cases of sensations of the same kind but differing in (a) quality, (b) extensity or volume, (c) intensity, and (d) duration.

5. What is a stimulus? How does it differ from a sensation?

6. What are the different kinds of sensations?

7. How would you begin a classification of the sensations?

8. What is the function of a sense-organ?

9. What are the sensitive cells? What is their function?

10. Draw a diagram of the eye.

11. Write short notes on :

(a) the blind spot, (b) the fovea, (c) zones of the retina, (d) after-sensations, (e) rods and cones, (f) binocular vision, (g) complementary colours.

12. Take a piece of yellow paper about one inch square. Paste it on a large sheet of dull grey paper. Put this at a distance of about thirty inches. Look at the paper for twenty seconds, and then look at another sheet of grey paper, at the same distance, 30 inches. Try again after putting the other paper at 15 inches and at 60 inches distance. Note your different experiences, and try to explain them.

13. Take small pieces of coloured paper, say  $\frac{1}{2}$  inch square, and stick them on the flat end of a pen, or a straw. Ask a person to sit on a stool very near a wall. He should face the wall and close one eye. He should keep the open eye fixed at the centre of a cross, drawn on the wall at the level of the eyes. Now place the coloured paper at the centre of the cross and move it along the wall in a straight line. Move it in four directions to the right, left, up and down. Ask the subject to speak when he notices any change in the colour. Mark these points. What is the field in which he can observe red, green, yellow, blue? Is any one of these fields larger than the others? If so try to explain why it is not of the same dimensions as the other field.

14. Draw a small O, and fill it in with ink. Now draw a small cross, about 3 inches away from the circle. Next close one eye, and hold the paper with the inked circle and the cross in such a manner that the circle is on the left of the cross while you are looking with the left eye. Also, turn it so that the circle is on the right of the cross, when you look at it with the right eye. In short, the image of the circle should fall on the nasal side of the retina. Now turn the paper slowly up and down, so that the cross remains at the same place, but

the circle moves up and down. Keep your open eye fixed at the centre of the cross. At one point you will not be able to see the circle. Explain why this is so. Where does the image of the circle now fall upon the retina?

Try this experiment with each eye.

15. What is the use of (a) the outer ear, (b) the middle ear, and (c) the inner ear?

16. What is the shake-organ (or the organ of equilibrium)?

17. What are the primary or elementary sensations of (a) seeing, (b) hearing, (c) tasting, and (d) smelling?

18. Outline a small area of the skin on the back of one hand. Now pass the lead of a pencil lightly over the marked surface. Mark the spots where it seems to be cold.

19. What are the different kinds of skin-sensations?

20. What sensations do we get from the muscles?

21. What are the movement-sensations?

22. Open your arms wide. Close your eyes. Now try to clap. Can you do so? Now, keeping your eyes shut, open the arms wide and with a single movement try to join the middle finger of the right hand, with (a) the middle finger of the left, (b) with the forefinger of the left. Can you do this? Do you make any mistakes? Try to explain the sensations that guided the movements of your hands and fingers.

23. What are the different elementary organic sensations?

24. Is there any relation between the intensity of a stimulus and the intensity of the corresponding sensation?

25. What is an image? Describe the differences between a sensation and an image.

## Chapter V

### A F F E C T I O N

#### 1. *Subjective consciousness*

We divided the conscious experiences into three modes, of cognition, affection, and conation (p. 31). We have so far dealt with the primary knowing processes as sensations of various kinds and qualities. The sensations mostly give us knowledge of outside objects. We see the table, the chair, and our hands and feet. So the knowledge obtained through the sensory processes is known as *objective knowledge*, or knowledge of objects. In itself it may be true or false. But there is another aspect of direct experience: one feels pleased, or sorry, to read certain news in the paper. The white and black marks on the paper give rise to certain processes of knowing the news in the paper. The connexions of the written words with the objects in the outside world are very intimate and deep. But the pleasantness that we feel is much more intimately connected with our subjective mental life. It tells us how *we* feel: that is, this part of experience gives us information only about ourselves. It does not tell us anything about other objects, it only tells us how we react or respond to our knowing of the objects. So the awareness that we gain from this aspect of affection is best described as *subjective consciousness*. But this information is never so definite as is the case with sensory knowledge. We have usually a vague *feeling* about ourselves in *relation* to our knowing or wishing processes. We can easily compare the height, width or colour of one chair with similar qualities of another chair or table. But we cannot so easily compare the qualities of intensities of our various feelings. Also, many times it happens that the sight, or sound, or touch that is commonly felt as pleasant becomes a source of opposite feeling or unpleasantness. A cup of tea or a piece

of chocolate is pleasant, but if consumed repeatedly at a stretch or under compulsion you may feel that they are quite unpleasant. Thus affection appears to be fairly independent of the stimulus-object or situation. Hence the aspect of affection is often described as giving a colour or tone to our conscious experience, e.g. the seeing of a beautiful sunset is toned with pleasantness.

## 2. *Affections are not localized*

We could classify sensations by referring to the bodily sense-organs (p. 37). But we cannot classify our affections so easily. We feel pleased with certain pictures, sounds, touches, odours, and tastes. On the other hand there are unpleasant scenes or pictures, sounds, pressures, touches, odours and tastes. So it is possible to feel pleased, or otherwise, along with any one or more of the sensory processes. In short, we cannot say that affections are connected with any one place on the body as we can do with the sensations. This may be described by saying that the affections have no special organ in the body, or that they *cannot be localized*. Further, when a man feels pleased, or displeased, he does not do so only with his eyes or lips, or nose; the whole of him seems to be changed with pleasure, or unpleasantness. So it is believed that there should be changes in the whole of the body, which correspond with the experience of pleasantness or unpleasantness.

We know from physiology that there are two sets of processes which are always going on side by side in our bodies. By one set of these processes, some part of our body is being built up, and by the other set some parts of our body are being used up (broken down) in various actions. To take a simple example; we eat food and store energy, but when we work hard for a long time, the stored energy is used up, and we begin to feel hungry. We eat and sleep, and so gather a fresh store of energy for further

use. In the same way there are delicate chemical processes (of *metabolism*) going on always in our bodies, and we may broadly put them into two classes, (i) the building-up, and (ii) the breaking-down processes.<sup>1</sup> And sometimes the one, and sometimes the other is dominant or more powerful. These bodily processes are in the nature of changes in the whole body. The domination of building-up processes often gives us certain feelings of freshness and general well-being. On the other hand, the excess of breaking-down processes leads to feelings of bodily tiredness or lassitude, and otherwise makes us feel generally uneasy.

### 3. *A theory of affections*

There is a simple theory that if any bodily change is in favour of the building-up processes, it is accompanied by a mental state of pleasant-toned processes, and the individual wishes to continue with those or similar bodily changes (or their stimulus objects). Further, if the bodily change leads towards an excess of the breaking-down processes, then that situation is experienced as unpleasant, and the individual wishes to alter the course of those bodily changes (or their stimulus objects). In short, if anything is good for the health, it is pleasant; and if anything is injurious to health, it is unpleasant. This is a very old and well-known theory. But it is only partly true. It is not true in every case. There are many poisons which are sweet and pleasant, e.g. sugar of lead (lead acetate); and there are a number of medicines which are very unpleasant and very useful, e.g. quinine.

### 4. *The kinds of affection*

We found that there were many kinds of sensations. So it becomes interesting to know whether affections are

<sup>1</sup> These are known as ANABOLISM, and KATABOLISM respectively. They are also described as ASSIMILATION and DISSIMILATION processes.

also of many kinds. Wundt said that the feeling experiences could be classified according to their characters of quality, tension and excitement. And in each character the dimension may be positive or negative. Thus there are six types or groups of feelings, which can be described as three pairs of feeling dimensions. These are grouped under (1) *excitement* and *depression* or (2) *tension* and *relaxation* as well as (3) *pleasantness* and *unpleasantness*. Any concrete experience of feeling may belong to one or more of these three paired groups. No feeling however can belong to both the classes of a paired group. No feeling could be both excited and depressed, or both tensed and relaxed, or both pleasant and unpleasant, at the same time. But any feeling could be described along more than one of these three pairs of feeling-dimensions. An experience could be both tense and pleasant. To take an example, at the time when our team is playing well in a keenly contested tournament, we feel a tension and pleasantness. If our team wins the match, then we feel excited, relaxed and pleased. But if they lose we feel depressed, relaxed and unpleasant. If the game is unfair, we may feel excitement, tension, and unpleasantness. In short the quality of subjective consciousness can well be described by one or more of these pairs of feelings. Further, there is no doubt that all the above states are about the subject, but the first two pairs are evidently complex experiences. During 'excitement' or 'tension', we have a complex bodily condition. It appears to consist of changes in blood-circulation, movements of respiration, and diffuse muscular contraction or general relaxation. Each of these changes would give us organic sensory experiences, mixed up in a very complex manner. The muscular sensations would dominate these sensory experiences. However, each of the organic sensations may be toned with pleasantness or unpleasantness. And these groups of sensations corres-



ponding to the 'complex bodily condition' may appear on the whole as pleasant or unpleasant. It seems wrong to describe the experiences of excitement, depression, tension or relaxation as simple types of feelings, especially as the mental condition during the said paired groups of feelings is to a great extent made up of muscular sensations. But the last pair of 'pleasantness' and 'unpleasantness' are not complex experiences. So these are the only elementary experiences of affection.

We have already seen that affections are not localized. They correspond to the general condition of the body, which can be easily described by the quality or excess of the 'building-up' or 'breaking down' processes. So it seems reasonable if we have only two primary general processes of affection—pleasantness and unpleasantness.

### 5. *Feelings*

The word 'feeling' is used in many senses. It is often used for feeling 'happy' or 'sorry' which are complex affective experiences. 'I feel it is going to rain', or 'I feel I am going to win'—are also commonly used. Here 'to feel' is used in place of 'to think'. Again it is often confused with touch sensations as 'the soup feels hot'; or 'velvet feels smooth'. In modern psychological literature, the term *feeling* is often used as having the same meaning as affection. Some psychologists like William James used this in a very wide sense, to mean any kind of conscious experience. Others use it in a very narrow sense. Titchener uses feeling only for those experiences where affection dominates the sense side, e.g. in smelling a rose.

We think that the term feeling should indicate the affective aspect of experience. This is necessary because we never have experience of simple affection. Affection is always mixed up with some sensations. To an ordinary uncritical person, it seems that the observation of many

objects is neither pleasant nor unpleasant. The experience of chairs and tables seems to be indifferent from the point of view of affection. But we can compare any two objects, say two chairs, and decide that one of them is more pleasant. Indeed when an important guest comes to the room, we request him (or her) to take the preferred chair. The result of this comparison shows that both the chairs were not entirely indifferent objects. For an experience must be pleasant to some degree before it can be compared in its pleasantness with another. So we decide that pleasantness or unpleasantness is always mixed up with sensory experiences although it may be so vague or weak as to remain unnoticed by us. Affection is an aspect of conscious experience, so it is never altogether absent from our concrete experiences.

We cannot easily follow Titchner in his description of feelings as an experience in which sensation is dominated by affection. For one, his description refers only to 'sense-feelings', and leaves out of account the 'centrally excited feelings' or felt experiences of past memories, or imagined events in the future. We agree that affection may be present in different degrees in various actual experiences. But the degree of the dominance of sensation by affection is very difficult to determine. So we will use the word *feeling* to indicate the *noticeable presence of affection*. Thus the experiences of simple pleasantness or unpleasantness will be noticed in simple feelings of smell, touch or taste. We may experience complex feelings in complex situations, e.g. the feelings of familiarity, or strangeness; hesitation, or decision. Here we have a noticeable affection mixed with complex processes of knowing and wishing.

#### 6. *The bodily changes*

We have already mentioned the theory that connects the experience of feeling with the building-up and break-

ing-down processes within the body. Experiments go to prove the existence of the following bodily changes during an experience of feeling :

(i) Changes in the breathing movements (or *respiration*), i.e. breathing may become fast or slow, deep or shallow. These movements can be recorded with the help of an apparatus called 'pneumograph'. The rise and fall of the outer surface of the body, corresponding to the lung cavities, is traced in the rise and fall of a needle pointer, connected with the apparatus, on the smoked-paper surface of a drum, revolving at a steady speed. A time-recorder is also used to mark second-intervals along the paper surface. It is from a careful observation of the record of breathing movements and the time taken for each breath, that we can judge them as fast or slow ; as deep or shallow.

(ii) Changes in the speed of blood (or *circulation*), i.e. change in the speed of heart-beats and pulse-beats. The movements of the heart-beats can be recorded with the help of a 'cardiograph' ; these can also be heard through a stethoscope ; the record of the pulse-beats can be obtained by a 'sphygmograph'.

(iii) Changes in muscular *strength*. Usually we can work better and for a longer time in pleasant company, or surroundings. But in unpleasant surroundings, monotonous circumstances or company, we usually get bored, seem to lose our strength and get tired in a very short time. The records of simple muscular activity, from the normal finger or hand, are obtained with the help of an 'ergograph'.

(iv) Changes in the volume. Expansion of the body can be noticed during many pleasant experiences ; and shrinking during the unpleasant ones. Changes in the volume of the hand can be measured by putting it in a water-filled cylinder directly connected with a recording tambour. This apparatus is called a 'plethysmograph'.

(v) Changes in electrical potential, i.e. the body may show an increased or decreased resistance to the passing of an electric current. These changes can be recorded with the help of a 'psycho-galvanic' apparatus.

Most of the above-mentioned changes are of a very small degree. But they can be measured by the use of delicate apparatus. Modern studies simply prove the facts of the bodily changes. An increase in bodily volume, strength, circulation, etc. may be described as a positive change: and the opposite or decrease in the same processes as a negative change. But positive changes do not always correspond to pleasant sensations, nor do negative changes to unpleasant sensations. Breathing may be 'fast' when we are excitedly happy; or it may be 'slower' when we are enjoying a restful happy thought. Pleasant music may quicken the action of the blood-stream and excite the muscles; or it may quiet the speed of the blood-stream, with a considerable relaxation of the skeletal muscles.

### 7. *Feelings and sensations*

The characteristics of feelings can be best understood by contrasting them with the characteristics of sensations. Both are elementary mental processes, but:

(i) Sensations are the processes of cognition, and feelings the processes of affection.

(ii) Sensations results from changes in specific sensory cells on the surface of the skin, or within the body. But feelings cannot be localized. They correspond to changes of the general bodily condition.

(iii) Sensations are of many kinds, e.g. visual, auditory, taste, smell, touch, etc. But the elementary feelings are of only two kinds, pleasantness and unpleasantness.

(iv) The different kinds of qualities of sensations can mix together and form a complex blend, e.g. red and yellow mix to produce orange; many taste, smell, tempe-

rature and pressure sensations mix to produce the tea-taste. But the elementary feelings cannot be so mixed as to produce a blend. If the pleasantness of tea drinking is mixed with the unpleasantness of the company, our experience is not an indifferent blend of feelings, in which both pleasantness and unpleasantness are lost.<sup>1</sup>

(v) If we repeatedly experience a sensation, our knowledge of it becomes very acute, e.g. the recognition of tones or colours, sounds or voices. But if we repeatedly experience a feeling, it becomes dull or blunted. The pleasantness in the wearing of a new suit, or the listening to a new gramophone record is lost after a few repetitions.

(vi) If we attend to a sensation, it becomes stronger and clearer. By attending we can detect a faint sound, or odour, or touch. But if we attend to a pleasantness, say of drinking tea, it vanishes.

(vii) Sensations present the facts of the outside world to us, and are *objective*. But feelings represent only *how we feel about* the sensations, and are *subjective*.

## 8. The law of feeling

If we compare the various experiences of feeling, we find that certain sensations usually lead to strong feelings of pleasantness and unpleasantness. There are others which are usually almost indifferent. Their feeling aspect is negligible. It has also been noticed that the sensations which usually enter into feelings are the sensations of smell, taste, and the organic sensations. Now all of these sensations are experienced on very few occasions. On the other hand, the sensations of sight, hearing and touch are

<sup>1</sup> In this case our feelings are mixed in such a fashion that sometimes the pleasantness, and at other times the unpleasantness of the situation becomes the centre of our experience. At no time are the two present at the same time (i.e. simultaneously). But there may be a very rapid succession of the two. In such cases the experience is said to be a state of MIXED FEELINGS. However, at no moment do we have a blend as in the case of sensations,

used very often. But these latter sensations very seldom give us strong pleasantness or unpleasantness. It is also clear that most of our knowledge of the outside objects comes to us from the sensations of sight, touch and hearing. And most of our knowledge about ourselves comes from the organic sensations,<sup>1</sup> and also from taste and smell. So the 'law of feeling' states: the sensations which mostly give information about external objects are least active in feelings; and the sensations which give least knowledge of outside objects are most active in feelings.

### QUESTIONS AND EXPERIMENTS

1. What is affection? Why may it be called subjective consciousness?

2. What is the simple theory of affections?

3. What are the many kinds of affections? Do you agree with Wundt? If not, why not?

4. What is the meaning of feeling in Psychology?

5. Describe the various bodily changes during an experience of (a) a pleasant smell, (b) the rainbow, (c) the taste of a bitter almond.

6. Compare and contrast affections (or feelings) and sensations.

7. What is the law of feeling?

8. What is a mixed feeling? [See footnote on page 68].

9. Is it correct to describe a mental situation as the experience of a mixed feeling? What will be your experience, if, on learning the news of your success in the matric examination, you slip and get hurt while running to give information to your parents?

10. How do you feel when a beggar suggests to you a happy future [marriage], and demands charity?

11. Take a number of differently coloured strips of paper  $1" \times \frac{1}{2}"$  [red, yellow, orange, brown, green, blue, purple, pink]. Arrange a screen to show two strips together. Ask a person to sit in front of the screen. Insert two colours and expose them for two seconds. Now ask the subject's preference. Keep a record of the preferences. Cover the screen, and change one of the strips. Again expose them for two seconds, and keep a record. Do this with all possible combinations, and make a table to show the number of times each has been preferred. Which is the most preferred colour? And which is the least preferred?

In a class of students, each subject should change places with the



experimenter after one complete experiment. The results of all the students should be compared, and answers given to the following:

(a) Whether all show the greatest preference for the same or for different colours?

(b) Which is the colour that is preferred most on the average?

(c) Which is the least preferred colour?

## Chapter VI

### ATTENTION

#### 1. *Attention is clearness of observations*

We often notice a difference in the clearness of our observations of objects in our surroundings. Objects of a similar degree of stimulus-intensity give us sensations which are very different in clearness. Suppose we are sitting beside a small table, upon which are lying a few magazines. The light coming from all objects on the table to our eyes may be similar in intensity, yet some of the objects will be more clearly noticed by us than the others. In other words, the sensations that come to us from a field of similar objects at any moment, are not equally clear in our experience. The impression of one object remains clearest in the field for some moments, soon this quality of being the clearest impression passes to others in the field. In each case, however, while some impressions are clearer, others are less clear. Let us take another example : Supposing two friends are talking together, while walking through a crowded street. There may be a large number of noises coming from other men and vehicles passing at the same time. Some of these sounds may be as loud or even louder than the voices of the friends ; yet they clearly observe their own talk. So there must be a difference in their manner of hearing their own conversation, and their reception of the other sounds of the street. The friends are not deaf to the other noises, but in their own conscious experiences, the other sounds are relatively less clear. This division of the field of conscious experience into clear and relatively *less* clear contents is the result of attention. Hence, *attention* may be described as *that manner of observation by which the field of conscious experience is subjectively divided into clear, and relatively less clear, contents,*

2. *Attention to, and attention from*

One can observe the lines of letters below at a single glance :

A	B	C
D	E	F
G	H	I

At a single glance, all the letters have a uniform amount of clearness. Now, if we attend to E in the centre, then the extremes A, I, and C, G, seem to lose a little in vividness. But if we attend to A, then C, F, I, H and G, seem to lose a noticeable degree of clearness, while A becomes clearer. So we can decide that while *attention to* an object makes its observation (or knowledge) a clearer content in the field of consciousness, *attention away from* an object reduces the degree of clearness of its observation (or perception). We can also notice that in any act of attention, there are some objects which are attended away *from*, just as there are some that are attended *to*. In the case of the friends' talk, the noises of the bazaar are *attended from*, and the voice of the friend is *attended to*. Further, these processes of 'attending *to*' and 'attending *from*' take place at the same time during the act of attending. The process of attention is on the one hand an 'attending *to*' one thing ; and at the same time, it is a process of 'attending away from' all other things. From this point of view, attention may be described as a dual process. Lastly, we can attend to only a small number of objects but we can attend away from a far larger number of objects. The number of objects attended to is limited by the 'range' of our attention. But while the 'positive' aspect is limited, the 'negative' aspect is relatively speaking unlimited. The above discussion is likely to give the reader an impression that attention deals with objects. So it must be emphasized that *attention is*

*primarily concerned with the mental impression of the objects.*

Attention has no influence or control over the field of stimulus objects ; but it is supreme in distributing clearness to the sensory impressions corresponding to the objects. When attention shifts from the mental impression of A to the impression of E, the object A appears to lose, and E to gain in clearness. But from the point of physical, objective qualities or clearness, the objects, A and E remain pretty well as they were before the shifting of attention. Subjectively speaking, however, the subjective clearness of the sensory impressions does undergo a remarkable change of clearness and domination in the patterns of the two psychoses, or moments in the mental experience of the observer. Attention is essentially a subjective *attitude*, that regulates the clearness of the cognitive processes, which appear on the stage of the conscious mental experiences. But the slightest shifting of subjective values is instantly echoed by the individual's appreciation of the clearness of the objects in his environment. And we must remember, that whenever we talk of attention to objects, it always carries an indirect or implicit reference to the mental impression stimulated by those objects. The young beginner however finds it easier if we refer to objects rather than to the sensory impressions. That is why we often refer to the objects in the outside world, and only occasionally to the mental impressions or observations of those objects. It is also more accurate to talk of numbers of objects, than about the numbers of impressions.

The *degree of attention* would be judged from the degree of clearness that results in the contents of our observation. Hence the best attention would be found when there is a concentration of attention upon one object only, and when there is a withdrawal of attention from all other objects. But this does not mean

that we cannot have a fairly clear knowledge of more than one object in any single act of attention. When we observe two objects at the same time, a *discrimination* between their different sensory qualities also occurs, as we attend to them. Of two coloured objects we discriminate the quality of one as red and the other as different, or orange. In the very act of attention we come to know that there is one line only, or that there are two lines near one another. We know whether a line is continuous, or that there is a short gap between two-points. We know that of two lines one is longer or thicker. In each of these observations the attention given to two objects does not take more than a fraction of a second (about 16/1000 of a second). The clear knowledge of any two objects however implies a distinction between them. Experiments tell us that we can see 4 to 6 separate digits or letters in a single attentive glance. What is curious is that we can also see 4 to 6 simple familiar words, or lines, or figures at a single glance. This fact is often described by saying that the *range of attention* is 4 to 6 objects.

Sometimes the facts of 'attending to', and 'attending away from', are compared with the focussing of a light. We know that the objects within the focus are clear and objects outside it are not so clear. So it is said that the observations attended to are in the focus of attention, and the rest are in the margin. The contents of the marginal field of consciousness are not being attended to; and some of them are being definitely attended away from. Of course, at any moment the focus of attention may shift from one content to another. Thus if there is content A (door) in the focus and B (wall), as well as C (window) in the margin, and if at any moment B (wall) comes into the focus then A (door) and C (window) will go back into the margin. Again if the focus shifts to C (window), the clearness of A (door) and B (wall) will become marginal only.

### 3. *The bodily attitude*

During attention there are some bodily changes which correspond to some extent to the changes in clearness that take place in the field of conscious experience. Our introspection points to the results of selective attentional processes which can be best described as *attending to*, and *attending from* ; in the same way, the bodily changes also play a double role. Supposing a man is sitting at a table, reading a book. There are a number of other books and papers lying on the table ; there are also pens and pencils and so on. Now when the student attends to a line in the book, he is making certain movements of the eyes. These movements are of such a nature that they enable him to have the clearest possible observation of the words written in that line of the book. Further, these movements *also* withdraw his eyes from other lines in the book, and other objects on the table. If he comes across a difficult word, and wants to look up a dictionary, then he makes certain movements of his head and eyes, to find where the dictionary is lying on the table. These movements enable him clearly to observe the dictionary and at the same time remove the study-book away from clear observation. And this is what we mean by the double role played by bodily movements.

If a visual object is very carefully attended to, as in the case of reading a highly interesting book, then we may not hear the footsteps of a person who enters or leaves the room. A fairly loud sound alone may be heard. In this case we have so modified our bodies, it seems, that the ears do not work with normal efficiency. They may be receiving the sound waves, but our brain or nervous system refuses to receive the impulses from the ear. Our mind is so busily engaged in the reading-processes of the book that the processes of low sounds remain unnoticed. In short, there is a considerable 'facilitation' of the



nerve processes concerning the reading of the book ; and there is a notable 'inhibition' of the nerve-processes concerned with the listening of normal low sounds. It may be that this 'facilitation' and 'inhibition' of cerebral nerve processes are determined by the activity of our attention. Or it may be that they occur in parallel with the attentional processes of 'facilitation' to the impressions from the reading of the book, and 'inhibition' to other impressions say from the sounds of footsteps. It appears as if we have effectively closed our ears. Just as we can close our ears during attention, so too we at times seem to close our skin (so to speak) and do not feel cold or heat. We must bear in mind the fact that in cases of concentrated attention, it is *not* that our other sense-organs become entirely closed to the receiving of their special stimuli. They now require a stronger stimulus, for the weaker one *alone* is not clearly observed by us. The stronger sensation (say sound or touch) can overcome all inhibitions, dash through the marginal field, enter the focal field of attention, and thus become a clearly observed content of consciousness.

#### *4. The conditions of attention*

What are the conditions of attention ? Why is it that an observed content becomes clearer than the others ? Are there any conditions which are different in the attended-to observations from those in the attended-from observations ? The above questions can be more easily understood, if we remember that our observations mostly refer to objects outside us. So we can ask what are the conditions in those objects of clearer observation. Further, we may remember that the process of observation is the result of an activity between a subject and its object. Attentional clearness is essentially a character of the mental impressions. So attention to these mental impressions is likely to be determined by certain subjective

conditions. Hence, the clearness of any observation would result from conditions in (a) the subject, and (b) the object. So we can discuss these conditions that direct our attention towards certain objects as *subjective* and *objective*.

(i) The subjective conditions

These conditions can be best described as *interests*. We are interested in some objects, so they can easily attract our attention. If a man A is interested in sport, another B in business, and a third, C in foreign news, and a newspaper comes into their hands, A will turn towards the sport columns, while B will look for business news, and C for foreign news. If on the same page there is news about China, and also about a test-match, A will more clearly observe the test-match news, and C will find it easier to read about China than the report of the match. Both the news items are printed in similar type, and have similar print for headings, so the difference in any news value for attracting the attention of A and C lies in the subjective interests of the two persons.

These interests are of many kinds, but they can all be put into the following classes : (a) instinctive or inborn ; (b) habitual or learned ; and (c) temporary or momentary :

(a) *Instinctive or inborn interests*, e.g. the interest of a butterfly in flowers, of a cat or dog in mice or frogs, and of a child in play, etc.

(b) *Habitual or learned interests*, e.g. the interest of young men or women in clothing fashions ; the interest of a scientist in scientific theories ; a particular reader's interest in news of tennis, hockey, football, or cricket, etc.

(c) *Temporary or momentary interests*, e.g. interest in a postcard or pen when wishing to write a letter (after the wish is satisfied the interest in the postcard or pen also disappears). Interest in an ash-tray while smoking ; interest in a needle while sewing, etc.

## (ii) The objective conditions

These can be put into a number of separate classes :

(a) *Quality*

The quality of colour in some objects is more *striking*, and so they attract our attention, and are clearly observed more easily than the others, e.g. a bright yellow colour is more clearly observed than a dull grey one. This condition would include the total quality of a striking visual form, sound pattern, smell blend, etc.

(b) *Intensity*

The more intense stimulus-object is likely to be observed. A loud sound is more easily observed than a soft whisper. Thunder draws our attention at once, while the low sounds of occasional rain-drops do not. The brilliant head-light of a car is easily noticed, but the dull lamp of a cycle passing by at the same time is not so easily noticed in the dark street.

*Size* is but an aspect of intensity. An advertisement in big letters catches our attention at once, especially when seen besides notices printed in small type. A camel is easily noticed beside a flock of sheep.

(c) *Change*

This is the most important condition in the object that is able to attract our attention. We do not attend to a simple object like a black spot for more than a few seconds.<sup>1</sup> But we can go on attending to rapidly changing complex objects like pictures on a cinema screen, or fields and trees from a moving train, for more than an hour. Our eyes may be aching, but the constant change of the scenes together with the changes in the plot of the story exert a very strong attraction on our attention and

<sup>1</sup> The longest period of constant attention to a simple stimulus as measured by experiments is 24 seconds. This period is called the DURATION of attention.

maintain the position of their impressions in the focus of our consciousness.

*Change* can be noticed in two ways. For one, it may be changes in the shape or position of a moving object, e.g. a waving hand ; a running horse, etc. A moving object is easily attended to. Thus change may be described as the condition for the observation of *movement*. Secondly, change may appear as an object with a contrasting colour or form among other objects. Such a *change* is an important condition for attention, e.g. a white face among a number of black faces ; a person dressed in black among a group dressed in white ; a single lighted window in a building where all the rest are dark. Such *contrast* is not simply of colours, there may be contrast *in shape or form*, e.g. a circle in the centre of a number of squares ; in letters,

H H O H H ;  
B B A B B ;

a word in italics in a *line* printed with normal type.

We may note an interesting relation between the objective conditions of attention, listed above as quality, intensity and change. A striking quality may have a natural intensity ; as certain colours depend upon longer light-rays, and certain sounds arise from a larger number of vibrations per second. Thus the statements 'striking quality' and 'intensity' of a stimulus-object would be inter-changeable terms. But the 'intensity' of any stimulus in an experience is relative to the lower 'intensities' of other stimuli acting within the same experience. Thus a 'stronger' intensity is one that is found in or alongside a group of relatively weaker intensity.

Sometimes the intensity may radically alter because of the very different groupings. A matriculation examinee is one of the senior-most students of his school ; but a few months later as a first year freshman in the college, he becomes one of the junior-most class. In short the degree

of 'intensity' in any stimulus depends upon the 'degrees of intensity' among other stimuli comparable with it. In a dull background a red coloured object has a striking 'quality'; it is more colourful or 'intense' than its surroundings; it also provides us with a 'change' in quality and form. From this discussion we may conclude that any form of 'change' is the important condition in the object for attracting attention, or gaining clearness for its impressions in consciousness.

### 5. *The kinds or forms of attention*

Sometimes we have experiences in which the nature of the object is such that it takes possession of our attention, without any effort on our part. When a loud sound occurs, we hear it clearly without any effort on our part. In this case we are passive rather than active. The activity seems to have its source in the object's intensity. There may be other cases of *effortless attention*, in which the object has some striking quality, size, movement, or contrast. Because this kind of attention is usually found among children, and the primitive animals, it is called *primacy* or *passive attention*.

But there are many situations in which we can attend to objects only after making an effort. If we do not like a book, but have to read it for the sake of an examination, then our attempt at clear observation, or attention to the contents of the book is not passive (nor spontaneous) but requires considerable effort. Such effortful attention for clearer observation is called *secondary* or *active attention*. An effort is necessary because the conditions in the object (the dull book) are not strong, and there are a number of other objects (or ideas) present at the same time, which are stronger in the total of their 'conditions for attention'. But the *interest* of the moment is very strong for the book (the need for the examination), and it rejects

claims of the other objects. The stronger the claims of the other competing object, the greater the effort necessary for continuing the study. If the dull book is to be studied when other friends are enjoying an interesting play or amusements then the effort is stronger. But if the dull book is studied while there are no companions, or thoughts of enjoying interesting amusements, then the effort is much less.

In almost all cases of learning a new task, during the first stage our attention is usually effortful (i.e. active). But when the task has been practised for a fairly long time, then it can be performed without any effort. When we first learn cycling, or typewriting, or a pattern for knitting, at first we have to make an effort to combine the movements in the proper order. While cycling we have to combine the movements of the feet, legs, trunk, arms, and hands ; and unless that is done in the proper order for keeping the balance the rider will fall off the bicycle. Hence, in the early stages the rider has to make an effort to perform the various movements in their proper order. Soon, however, he can perform all the movements efficiently, and they go on following one another automatically. There develops a habitual cyclic order in the given chain of actions, and now it is no longer necessary that any one of them be clearly observed by him, or attended to. But the movements of cycling or knitting now are certainly controlled in an equally excellent manner ; so they must be present in the mind, although not in its focus. When we have such a case of present effortless attention to a complex task, which at first required effortful attention for its performance, then this kind of attention is called *secondary-passive* (or *derived primary attention*). It is called *passive* because it is effortless now ; but it is called *secondary-passive*, because these actions were performed originally with an effort. It is certainly very useful to us that we can successfully per-



form a large number of actions without any effort. So we find it necessary to pay effortful attention only to a few more important or little-known activities. We habitually perform a large number of our daily actions. We talk, and walk, and dress, as a matter of habit. While learning to perform these actions we had to closely observe our various movements; we had to pay effortful attention. But once the habits are formed, it is necessary to pay attention to 'what to talk', or 'where to go', or 'what to put on', and having decided, we need not pay any effortful attention to the rest of the business of talking or walking, or dressing. Hence, *secondary-passive* attention helps in the economising of mental effort.

#### 6. *Attention and bodily tendencies*

A question may be raised here: Why do we offer passive attention to certain objects? We know they have peculiar characteristics of quality, intensity or change. So, it may be asked, why do we easily (i.e. passively) attend to these characteristics in the stimulus-object? There is a very simple answer: we are born with a peculiar nervous system, or *bodily tendencies*. And these are such that we clearly receive and notice the presence of some qualities, intensities and changes in our environment. Perhaps such observations are very important for our *life*. If an animal cannot notice such changes at once, it will not be able to get food or save itself from enemies in the jungle.

The same answer will hold good when we ask questions about active or *secondary-passive* attention. Our nervous system or *bodily tendencies* are not at first fitted to meet the tasks. So in these cases we have to make an effort to observe the situation, and perform the task. But when we have become practised—when the task has become habitual—then *our nervous system has been modified* to suit the task of cycling or knitting. In short, *we have develop-*

*ed a new bodily* (or nervous) *tendency* and so we are in a position to perform those tasks without any effort. The question of bodily or nervous tendencies is after all a question of 'facilitation' and 'inhibition' of nerve connexions. We have said earlier that attention processes run parallel to such alterations in nervous processes. So we can readily agree that the nature of 'attention' is intimately related with the 'bodily tendencies' and their development in any individual. The term 'bodily tendencies' describes the same facts as the 'modification of the nervous system', and these tendencies may develop in a very short while or take a considerable time. One boy can learn a new method of mathematics well after two or three repetitions only, but another may learn it only after twenty or more attempts. The difference is due to the fact that one has a nervous system which can be easily modified for facts of mathematics, and the other has not. Again, we can explain why a cat is interested in mice, or a butterfly in flowers, by saying that they have different bodily tendencies. So *the differences in minds*, or mental constitution, can to a large extent be described as *differences in bodily tendencies* (or the nervous system).

### 7. Attention and affection

If anything is decidedly pleasant or unpleasant, then we feel interested in it. There may be a disturbing noise, or a pleasing odour stealing into our nostrils. We feel interested and so want to clearly observe the source of that noise, or that odour. By attending to the sound, we find it is the noise made by children outside. We also know that we can ask them to keep silent, and thus remove that disturbance, and we act accordingly. If anyone asks, 'Why did you attend to the noise?' we shall say, 'Because it was disturbing and unpleasant'. Again, on inquiry we may discover that the pleasant odour is coming from the kitchen, where some tasty dishes are

being cooked. And we may ask for them to be served immediately. Now, if anyone asks, 'Why did you attend to that odour?' we shall say, 'Because it was interesting and pleasant'. In other words, we attend because we have an interest.

We often come across interest leading to attention. In the case of a concert audience, a musician attends to the harmony of sounds, a painter attends to the colours of the clothes and instruments, and a physicist to the patterns of the air-waves. They attend to different objects because they have different interests.

We also find that continued attention to any object leads to the development of an interest in it. A young man just out of school or college, when first put to work in an office, or a shop, does not like the change. Neither can he pay much attention to the work. But when he has been working for a number of months, he may develop an interest in the clerical work or the art of selling goods. He may begin to love his work. Here we have an example of attention leading to interest. So the relation between attention and affection is very wonderful. It is a dual, a two-way reciprocal relation; affection leads to attention; and again attention also leads to affection.<sup>1</sup>

These facts have been considered by Titchener as showing that the two processes of attention and affection are 'the back and the front' of the same experience (or state). He reminds us that (i) we cannot attend to affection, and that (ii) affection, like attention, refers to the whole field of our consciousness at any moment. So he thinks that the two are always present together in experience just as length and breadth, or front and back, in the case of a physical object. He warns us *that it is not that we attend and then feel*, but that *while we attend we are also feeling*.

<sup>1</sup> 'Affection' here is used as a general term, including 'interest' or 'liking'.

In every case of feeling there is always a sensation, and usually every sensation is mixed up with affection. However, the affection may be in the centre or focus of our consciousness; or the sensation may be clearly observed by us. But we cannot attend to affection, i.e. pleasantness or unpleasantness. So in any mental experience attention and affection are always present, but we are clearly conscious of only one of them, either the sensory experience or the affection.

### QUESTIONS AND EXPERIMENTS

1. What is attention? What happens to the contents of the field of consciousness during attention?
2. What is the effect of attending to, and attending away from, on the observation of any object?
3. Do we attend to the object or the impression of the stimulus-object? Does that show that attention is a subjective process, or otherwise?
4. What is meant by the focus and the margin of the field of attention (or consciousness)?
5. Do the processes of 'attending to' and 'attending from' occur at the same time? Give examples to illustrate your answer.
6. What is the bodily attitude during attention? Can this be divided into processes of attending to, and attending FROM?
7. What will you do if you want to listen to a faint sound coming from the other side of the wall?
8. What are the conditions of attention?
9. What are the subjective and the objective conditions of attention?
10. What are the different forms of attention?
11. What are the forms of attention in the following cases?  
 (a) A small child looking towards a big red balloon. (b) A dull child doing a difficult sum in arithmetic. (c) An adult buttoning a coat. (d) An Indian [Intermediate Arts] student listening to an easy poem in English. (e) A college girl washing her face. (f) Yourself dusting the blackboard. (g) Listening to a topic described as 'important'.
12. What is the relation between attention and affection?
13. Make a thin cross in ink in the centre of a sheet of paper. Hold the paper a foot away from your eyes. An experimenter with a watch with a second hand must tell you to be ready two seconds before the

minute. On the minute he calls out 'Attend' and your attention must be focussed on the centre of the cross. Each test will last for two minutes and whenever your attention shifts from the centre you must make a stroke on a piece of paper without taking your eyes off the cross. The experimenter notes down the exact time of each stroke you make. Try this experiment five times and note the average length of one duration of attention.

A similar hearing test can be tried with a clock held at a distance to make the ticking barely audible. You should make a stroke on a sheet of paper whenever you cannot hear the ticking of the clock.

## Chapter VII

### PERCEPTION AND IDEAS

#### 1. *General*

Perception is that mental process by which we get *knowledge* of objective facts.<sup>1</sup> It is a complex experience which is made up of a group of sensory processes. It usually consists of sensations, and images or meanings, e.g. the taste of tea is made up of sensations of sweet, bitter, smell, temperature, and pressure, and images or meanings of Lipton or Brooke Bond, good or nice; the visual *knowledge of a book* is made up of the sensations black and white, shape and distance, and a variety of associated images or meanings.

#### 2. *Characteristics of perception*

We already know the following characteristics of perception :

(i) It is a *complete mental process of cognition* made of sensation and images.

(ii) It gives us *knowledge of outside objects* : it is always more or less meaningful, e.g. we hear a sound, and know it is coming from a bell ; or we see an object and know it is a motor car ; we knock against an object in the dark, and guess it is a chair.

The experience of headache, or of toothache seems to be different. It does not appear to give us any knowledge of an object outside us. But this confusion is due to the fact that our body is also an object outside the field of our conscious knowledge. The felt ache or pain is an unpleasant experience arising from a particular part of the head or the tooth. The experience is similar to that

<sup>1</sup> It should be noted that the term 'knowledge' refers only to the cognitive aspect of conscious experience,



when the eye sees the individual's own hand or foot, and the latter become objects of visual knowledge.

(iii) It is always experienced when *there is an object that excites our sense-organs*. If there be a table or a chair before my eyes, it is only then that I can have a visual perception of those objects. The sound of any object must first be received by the organ of hearing in the ears, before I can understand the object of that sound. Any experience where we have a group of images only, without any sensations, cannot be described as a perception. There must be some sensations, and the images may be in a large or small proportion.

(iv) It is a *combining* (or synthetic) activity. We combine the various sensations and images into the knowledge of an object, e.g. sensations of sweet, sour, cold, smell and pressure into the taste of lemonade.

(v) It is also an *analysing* activity. When I look at my table, I may analyse the field of my vision into perceptions of books, pens, papers, and table-cloth. The various parts of the field appear as distinct objects, because the sensations coming from those parts seem to be more closely combined together than the sensations from the surrounding parts, e.g. white paper on a white table-cloth. When we perceive the paper, we analyse our field of vision into 'paper' and 'other than paper'. The sensations received from the 'paper' appear to be more compact and unified than the sensations received from the rest of the background. Thus a combination or synthesis of the sensations referring to an observed figure, at the same time analyses or separates the figure from its background.

Sometimes analysis is taken to indicate a breaking-up of the world of our sense-knowledge into various parts, e.g. qualities of colours, sounds, touch, smells, etc. We divide the world of space into points on our skin, the position and direction of our limbs, and the position of objects to the right or the left, in front or behind, near or far. We

are aided in this task by the senses of sight, touch and movement. Lastly, we note the passage of time, and judge intervals as equal or unequal, as rhythmic or irregular. We note certain events as occurring before or after, or at the same time as others. Thus we break up time to get a more accurate knowledge of the series of events and incidents which form part of our daily mental experiences. We are assisted by the rhythmic experiences of respiration and walking, in our knowledge of temporal events.

Titchener says, 'perception means a breaking-up of the world around us'. The chaos is broken-up, sub-divided and arranged in parts: 'quality parts, space parts, time parts'. But he is evidently overlooking the synthetic aspect of perceptual activity, which is so necessary in the performance of any analysis. We must however note that both the aspects of analysis and synthesis occur at the same time. We agree with Stout when he says, 'perception is an analytico-synthetic' activity. Inasmuch as each experience of perception is a distinction of the meaning of an object, or a class of objects, it does imply a sub-division of the world around us into classes of distinct meaningful units. Thus perception leads to a mental distinction, classification, sub-division and understanding of the objects and their relations. Perception can be called a 'breaking-up' of the world around us, if we limit the use of the term 'breaking-up' to the breaking-up of a confusion or disorder, and the establishment of a meaningful system and order. However in each 'breaking-up' of a situation through the activity of perception, there is also the 'making-up' of the knowledge of individual objects and their relations within that observed situation.

### *3. Attention and perception*

Sometimes it is said that perception is selective, or breaks the world into distinguishable objects or parts,

Being selective, it is intimately connected with the other selective activity which we have discussed as attention. Though it may be possible to experience a simple sensation without any special effort or activity of attention, it would be impossible to know an object as distinct or clearly different from other objects without the activity of attention. Further, the details of an object can be clearly known only through attention. For example, we may know a figure as made up of lines and colours, but a clearer observation of details alone can tell us that the perceived object is the physical map of India. Each perception implies some process of attention. The conditions of the moment determine whether this attention will be passive, active, or *secondary-passive*. But attention and perception must always go together.

#### 4. *The development of perception*

Our perceptions differ in their content with differences in age and past experience of similar objects. At the earliest stage the new-born baby has no distinct perception of objects. His consciousness is at once full of smells, sights, sounds, pressures, temperature, and organic sensations. There is no distinction of the qualities or kinds of sensation. The whole experience, in the words of W. James, is 'a big blooming, buzzing confusion'. But in a few months' time the child breaks up this confusion of sensations into perceptions of objects. Men and women move about in the room; chairs, tables, and walls remain fixed in the room. The moving *persons* are nothing but *groups of sensations* for the child. But gradually some of these groups of sensations are attended to, and held together as *units* or *objects*. These perceptions of objects are the mixtures of sensory processes only, so they may be described as *pure perceptions*.

When the same object is observed many times, then the sensations received in later experiences are likely to

be mixed up with some images of the past experiences. In the summer, when a child sees a bucketful of water, and puts his hands in it, he finds the experience quite pleasant. Next time he comes across a similar bucket, the images of putting his hands into it, and the pleasant experience of cold, are likely to reappear in the child's observation. These images of movements resulting in pleasant cold impressions (or incipient urges) would induce the child to repeat the earlier movements and enjoy similar sensations. When a child enjoys one piece of sweet, he needs no invitation to get another and enjoy that. In this desire to repeat an activity that was satisfactory at an earlier moment, we may note the activity of images of the past experience. *These images enrich the later observation.* The child not merely sees a visual object in the bucket, he now somehow knows that 'the visual object' is also an object with touch and cold qualities. The sight of the second piece of sweet is mixed with the images of his earlier taste and enjoyment. This admixture of images also alters the conative aspect of the total experience. A vague ill-defined, hesitating conation of the first experience, now becomes a definite urge or desire. Thus we conclude that the mixture of images with sensations in a perception gives us a more complex and richer knowledge of the observed object.

Soon the child begins to distinguish persons from objects, and then the different persons among themselves. For instance, the child is taken by the mother, held in comfort and given nourishment. But if the child is taken by another person (say the father) and held in comfort, he does not receive any nourishment. So a comparison of the one experience (from the mother) with the other (from another person) makes the child know the difference between one group of sensations as the mother, and the other person who is not-mother. In these cases, the distinction between the two objects is based upon the

presence of certain sensations in one group and their absence in the other group of experiences. The knowledge that group A was different from group B, implies the presence of certain *images* about A together with the sensations of group B. Thus the absence of certain sensations is noticed through the presence of their *images* in the experience. The experience with the mother is 'handling sensations+nourishment sensations+pleasantness'; but the experience with the not-mother is 'handling sensations+nourishment *images*+some degree of unpleasantness'. The addition of images in the later experience enables the child to experience a more complex perception. He now knows not merely the object referred to by a sense-group as A or B, but he knows the object B, and distinguishes a difference between it and A.

To revert to the example of the child's distinction between the 'mother' and the 'not-mother'; supposing the child is again taken by the mother from the 'not-mother'. The child may again anticipate and get images of nourishment. But now his experience satisfies the anticipatory nourishment-images (and indefinite hopes or wishes), so he will have a *richer*, or more detailed knowledge of the mother as 'an object that gives nourishment sensations', and the not-mother as 'an object that does not accompany nourishment sensations'. Here the distinction between the two perceptions is the result of a satisfaction or dissatisfaction of the anticipatory images. The distinction is not simply due to the different sensory experiences. It is also essentially due to the meanings obtained, because of the presence or absence of images in certain perceptions. At this stage the perception of the object is a mixture of sensations and images. So such perceptions are usually called *mixed perceptions*.

Further as the mixture of sensations with images is very intimate, so in this kind of perception sensations

may be said to assimilate the images. Hence such a perception may be described as a *cognitive assimilation process*.

When the child grows older he learns a number of words, or names of objects. The word-sound is taken to mean an object with many qualities. The sound of the word 'dog' becomes through the mixture of many image-processes the sign of an object that gives rise to many sensations of touch, vision, hearing, and so on. When the child begins to understand words, his experience is a complex of sensations and images. But some of these images help him to know the *meaning* of the related objects or their groups of sensations. For instance, the child's experience on hearing the word 'dog' is made up of 'sound sensations' of the word 'dog'+images of touch, sight (shape and colour) and sound (bark)+the meaning of the object 'dog'.<sup>1</sup> In most experiences, the heard sound 'dog' will carry all its meaning in the form of images. But if the meaning is abstract, or refers to a complex or an abstract quality of the dog-like loyalty, friendship, watchfulness, then these meanings cannot be fully expressed in definite images. In this case, we may say that the experience of hearing and understanding the sound 'dog' consists of sensations, images and meanings.

We may add that each perception is meaningful. In 'pure perception' the meaning is somehow implicit in the sensations. In the case of mixed perception or a cognitive assimilation, usually the meaning is partly carried by the sensations and partly by the images making up the given experience. However, where the experience of mixed perception contains the knowledge of some abstract qualities along with other concrete aspects of

<sup>1</sup> The meaning part of his experience may be full of detail or only vague. The vague part may be analysable into vague sensations and images, e.g., kinaesthetic and organic sensations, and indistinct sight and sound imagery.



the perceived object, the meaning is partly carried by sensations and images, and partly as a meaning-element, e.g. 'Honesty is the armour of the humble peasant'. Here the term 'meaning-element' refers to that part of the experience which is too vague and indefinite to be called a sensation or an image.

It is clear that many perceptions are such that their meaning part is more important than their sense part, or image part, e.g. wealth, peace, profit, loss, etc. These are called *symbolic* perceptions. The sensory part of the experience is often very different from the meaning carried by it. This is specially true of written and spoken words. The visual experience of the written word 'dog', or the sound of the spoken word 'dog', is very different from the object *dog*. All names or nouns and pronouns are examples of speech symbols for their objects.

Sometimes certain objects become symbols from other kinds of qualities or objects, or events. The fact that some perceptions are *symbols* or signs for other facts or objects is easily noticed in the following statements: The flag at the palace *means* that the king is in residence there. A red fez on the head *means* that in all probability the man is a Muslim. The red mark on a Hindu woman's forehead indicates that she is married. A black band round the sleeve of a coat implies mourning for some recently lost relation. In these cases the experience of the observer is made up of (i) visual sensations of colour, form and distance, and the position of the flag (or the cap), *plus* (ii) images of other similar objects seen on past occasions, *plus* (iii) meanings made up of ideas—'the king is in residence', or 'this man is a Muslim'. In the above cases the meaning part of the observation is certainly far more important than the number of sensations that are received from the objects perceived (the flag, or the cap). In a sense, we may describe them as higher order symbols. However, all such perceptions are called *symbolic* perceptions, for

here the sensory processes are simply symbols for the objects or facts whose knowledge we gain from them.

So the perception of objects develops through a number of stages. At first we have *pure perceptions* and knowledge of objects as bundles of sensations. In the third stage we have *symbolic* perceptions, and get a knowledge of objects as symbolized in the mixtures of sensations and associated images. The meaning aspect dominates the experience in symbolic perception.

### 5. *Apperception*<sup>1</sup>

If we perceive the same object, or similar objects on many occasions, then a change takes place in the manner of our knowing those objects. Supposing I meet a man named C.D. wearing a red coat, walking at 5 p.m. on the road from the Lawrence Gardens. If I meet him every day for a number of months, then I form a *habit* of knowing a man as C.D. when I see anyone wearing a red coat at that time and place. Instead of knowing the man after clearly observing his face, size, etc., I come to know him clearly by simply seeing the red coat. Thus I spend less time and energy in the knowing of the object. This 'habit of knowing' objects may also be described as the formation of a 'cognitive disposition'. It is the activity of my cognitive dispositions that makes me know one person as Mr X, and another as Miss Y. When I see X, I do not simply perceive a man; but also know his religious, economic and social interests, in the light of my knowledge about him.

It will be easily noticed that the activity of cognitive dispositions leads to the experience of symbolic perceptions. In the earlier example of C.D., a red sensation from the coat of a person walking on a certain road, at a particular time, becomes symbolic of Mr C.D. It is also

<sup>1</sup> Originally 'apperception' meant a clearer perception.

evident that the red sensation is mixed up with a large number of images, some of which refer to Mr C.D. These images of course depend upon a particular internal excitation of the brain or the nervous system. Without this particular excitation of the brain or nervous system I would have no C.D.-images; and so knowledge of only 'a red coat' and not of Mr C.D. Our present experience, however, is not the perception of a red coat, but of Mr C.D., so this kind of experience is called by a definite name, *apperception*. The images and ideas that form the cognitive dispositions active during apperception are also known as 'apperception mass'. In each case of apperception, the mind is well prepared, and itself furnishes a large part of the knowledge of the perception. The mind is very active in this case; it seems as if the stimulus-object is rather passive. The mind so-to-speak goes out to the object, and moulds the meaning of the object. In more technical terms, apperception may be defined as '*a perception whose character (or meaning) is chiefly determined, not by the nature of the sensations, but the influence of the past experience (or the nervous tendencies)*'.<sup>1</sup>

If we take this influence in a very broad sense then every mixed and symbolic perception can be described as a case of apperception, since it contains certain images. Hence it is sometimes said that 'every perception is an apperception'. But if we must distinguish the two, then let us reserve the term 'apperception' for those cases of perception where the influence of past experience or cognitive dispositions is striking. We may, however, simplify our definition by saying that an apperception is the *interpretation* of a perception. We may interpret in the

<sup>1</sup> The readiness of a nervous system to reproduce certain combinations, or conditions, is called a NERVOUS TENDENCY. In the case of apperception, these tendencies lead to the reproduction of conditions for the experience of images that refer to certain objects [cf. pp. 78-9.]

light of past experience our perception of a moving white and brown object as a cat. But our apperception may, or may not, agree with the actual object, which may be a rabbit. When we misinterpret the material of our perception, then our experience is a *false* perception, or illusion, e.g. medical men often misread the word psychology as physiology.

## 6. Illusion

An illusion is a false knowledge of the object that is stimulating our sense-organs. If I take a piece of rope for a snake, then I shall be having an illusion. If I mistake a white object for a yellow one, then also I shall have an illusion. But these two illusions are not of the same kind. In one case, I interpret a rope for a snake; so this is an *apperceptive illusion*. The misreading of psychology for physiology (or vice versa) is also due to apperception. In the second case, there is something wrong with my eyes (jaundice), so the white object is observed as yellow. The second case of illusion is a *sensory illusion*.



FIG. 13.

The illusion about the duration of time is well known. In pleasant company time seems to pass very quickly, but during difficult tasks or in unpleasant company a few minutes seem to drag on like hours of agony. Such wrong estimations are also forms of apperceptive illusions. Here, the affective (and conative) aspects of the experience seems to contract or expand the objective aspect of the time that has passed.

The *illusion of the sense of sight* are quite interesting. Equal distances between two pairs of points appear un-

equal, if the one ends in arrow-heads and the other in feather-heads (see Fig. 13). The shape of a circle may be distorted if a number of chords are drawn through it from a point outside it (Fig. 14). A pair of parallel lines can be

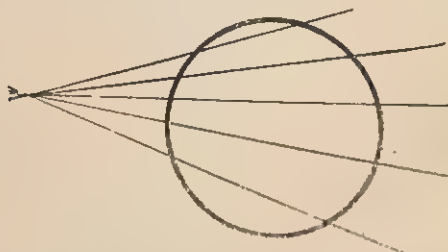


FIG. 14

a pair of parallel lines can be

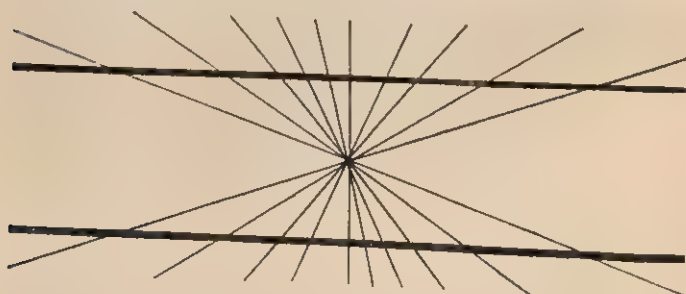


FIG. 15

made to appear bulging by drawing a series of intersecting lines running through a central point (Fig. 15). Lines



FIG. 16

may appear longer because of contrast with shorter segments (Fig. 16).

## 7. Hallucination

Hallucinations also are another type of false experiences. If an image is taken to be a real sensation, then we have a hallucination. If I imagine my friend's voice, but the image is so clear that I believe I hear real sounds made by my friend, then I shall be having a hallucination. While dreaming, our images are usually so clear and striking that we believe them to be real. So the dream-images are common experiences of hallucinations. Hallucinations while one is awake are mostly the result of abnormal nervous or mental conditions.

## 8. Ideas

We have said that an image is the copy of a sensation. Just as sensations combine with meanings to give us perceptual knowledge of objects, *in the same way a group of images only may carry the meaning of an object, or a class of objects*. Such experiences are ideas of objects. In the simplest case, an idea is an image plus a meaning. We have ideas of individuals or of classes ; e.g. I may have the idea of Mr C.D. walking in a red coat, or the idea of horses as a class in the judgement 'horses are intelligent'. Such class-ideas are sometimes known as 'abstract ideas'.

We know that there are pure perceptions in which the sensory element is much larger than the meaning-element ; and that there are symbolic perceptions in which the meaning-element is dominant. So also there are ideas like chair, table, in which the image-element is well marked ; and other ideas like wealth, freedom, beauty, in which the meaning-element is dominant. This is specially the case with the ideas of classes of objects, or class-ideas. When we have the idea of a class of triangles, or horses, our experience is not simply the image of a triangle, for it must contain all kinds of triangles, big or small, equal-sided or unequal-sided. In other words, it is an idea of triangularity. Similarly in the case of the horse, *our*



*experience cannot be the image of any particular horse, for it must refer to all sizes, colours, and uses. In short, it is an idea of horse-ness.*

We know that individuals differ in their mental tendencies. So we find, there are various kinds of minds and they have different kinds of experiences about class-ideas. Some of them get (i) a composite image which carries the common features of a large number of objects (e.g. horses), but its size or shape is vague in outline. Others (ii) find a number of images which go on changing in a continuous manner, e.g. a white horse, a black, brown, spotted one, a horse eating, drinking, running, playing, fighting. The various images follow each other in quick succession. In short, the images are mobile images. There are others who find (iii) one image of a particular object (horse, or man), but the background is always changing. Lastly, there are some that get (iv) a symbolic image, e.g. the image of a skull and bones for 'death'; a naked sword for 'victory'; a revolver for 'murder'; and so on.

Class-ideas are also known as *concepts*.

### 9. *Perceptions and Ideas*

Perceptions are the processes that obtain for us our knowledge of the world around us and ideas keep or carry the meanings of our world with us. The processes of perceptions and ideas are similar in some respects, and different in others. To take their *similarities* first: (i) They are *complex* mental experiences. The perception of an orange contains hundreds of visual sensations, images and meanings. The idea of a college, or a teacher, or one's home is made up of several images and meanings. (ii) Both perceptions and ideas are *cognitive processes*. They refer to our knowing of this world. We perceive one object as a chair, another as a table; this man as a friend, that man as a stranger. Ideas of correct dress, manners,

right and wrong, are intimately concerned in daily behaviour. We have ideas about the efficiency of patent medicines, honesty of lawyers, or the sportsmanship of cricket players. It is ideas, in their numbers and varieties, that help to make up our knowledge about many things. (iii) Both perceptions and ideas *correspond to the space and time order of the objects and events* that stimulate mental experience. In looking at a chair in a room one can recognize its position in connexion with other objects in the room. If the chair is lower than a table, and the seat pushed under the said table, then I cannot see it as higher or put above the table. In short, perception has to follow the space-order dictated to it by the objects seen by the eye. The idea of a college or a home too follows the actual experience. The height of the college building does not alter; the middle and the bottom in the idea correspond to the actual objects. If one has experienced a dust-storm followed by rain, an idea cannot reverse this relation, and produce the idea of rain followed by a dust-storm. Ideas must contain the original series of events.

There are equally important *differences* between the experiences of perceptions and ideas; (i) An *external excitation* of the sense-organs is an essential part of the experience in each perception, whether pure, mixed or symbolic. But an absolute absence of any external excitation of the sense-organs is essential for an idea (or an ideational experience). I may see a picture for some time, and get a perception. Supposing the same is then hidden behind an opaque screen; then I may get visual images in my idea of the same. (ii) Perception is *clearer*, more definite and detailed, than the corresponding idea. When we look directly at an object everything is clearly before us. But when we try to reproduce the experience in the form of an idea, many details may be missing, although all of them were definite in the original perception. At the same time, it is possible all the details were not clearly

noticed in the first observation. (iii) Perception has a definite and direct objective reference. The idea is relatively a subjective product, and has only a loose and indirect reference to the object. Perception only partly belongs to the observer, in knowing it he comes to know certain properties of the not-self. Ideas on the other hand appear to belong entirely to the observer. (iv) Usually the perception is much *more vivid* than the idea. The perception of a lamp of one candle-power is more vivid and striking than the idea of a hundred candle-power lamp. (v) Perception *depends upon the momentary sensitivity of our sense-organs*, and its contents alter with the changes in their position and movement. The idea, however, is free from this dependence. A man with a bad cold cannot smell a rose, but he can enjoy the idea of its scent, even as he could in his normal condition. We get one impression of an object when looking at it from a certain angle, but this impression changes if the object is moved. On the other hand the idea of a friend that comes to mind, while one is sitting on the ground floor, will not be altered, if one goes to the roof-top. The idea is relatively independent, and can change with any alteration of the images underlying it. I see a girl in the class, but I can also imagine her as playing tennis or singing in a group. So the idea of an object can also get new meanings, in altogether unexperienced or fanciful situations. This is specially so when we combine many ideas, and gain hopes or fears of future events. (vi) Perception can become a source of new knowledge by one's observing actual new features of the given object; but the idea is limited to past experience and can only gain imaginary and probable knowledge of novel features of the object.

#### 10. Perception of space

We come to know the space-qualities of objects; we also learn or discover the spatial relations of these objects,

This occurs by our noticing the spatial characters present in our sensory experiences. Sometimes we transfer space-meanings from one sense experience to another by combining the knowledge observed by one sense-organ with that observed by another. Our visual and touch sensations give us primary facts about space. We see things in different positions, and note the variety of their shapes and sizes. Here our knowledge is a fair presentation of the number and positions of the cones and rods in the retina, stimulated during the perception. As one looks at the room, the retina is stimulated at different points by the size and positions of the objects in the room, and one is conscious that one object is to the right, another to the left; one is lower and another is higher, one is large and another is small. One is near and the other is far.

It is said that whenever we see an object, there is a tendency to move the eyes so as to focus upon the fovea the image of the object whose impression was falling somewhere else on the retina (p. 40). Thus the visual impression of each point on the retina is accompanied with the images or ideas of the pattern of movement-sensations necessary to bring the corresponding object into focus on the fovea. This pattern of kinaesthesia gives a clue to the locality on the retina, and thus indicates the position in outer space. In other words, the pattern of kinaesthetic sensations and images is intimately associated with each point on the surface of the retina. Thus, the excitation of each point on the retina, carries a distinctive 'local sign', and this simplifies our observation of position in visual space. In the same way, it is said that each point on the skin has a distinctive 'local sign' for its sensation.<sup>1</sup> The movement-sensations form, and bring

<sup>1</sup> If any part of the skin (say the fleshy part near the elbow) is stimulated at the same time on *two* points near to each other (say with the points of a divider or compass), then often the experience is of touch sensations from *one* point only. When the distance is

out the distinctiveness of the 'local signs'. Thus all the three co-operate in the accurate perception of space. The movement-sensations also differ in the case of the different distances and directions in tactual space. Thus perception of space is the addition to visual data of images and ideas, corresponding to tactual kinaesthetic data. It is to a large extent a process of learning, and development of meaning.

Sounds also tell us about the position of the sounding objects. Auditory localization is assisted by visual and tactual data in all normal persons. The blind have to depend most upon sounds and touch. Their appreciation of sound is extraordinary, and echoes solve a number of their problems about distance and direction.

### 11. Perception of time

The number of rhythmic activities in our bodies are linked with the passage and measurement of time. The muscular data of respiration, and walking (or locomotion) can be tutored to estimate considerable intervals of time. A seasoned sentry often can tell to the minute when he has walked his beat an hour. Hunger and thirst are good gauges of the time intervals between meals.

### 12. Perception of movement

Movement is perceived by the eyes, when the moving gradually increased, then after a certain interval the subject will notice two distinct touch sensations. This distance varies among individuals as well as the various parts of the body, and is called the 'two-point-threshold' or the *Aesthesiometric Index*. It is lowest in the fore-finger tips and highest in the back near the shoulders. At one time it was imagined that this index shows the sensitiveness of different persons and that small areas of the skin have common nerve-connexions as well as common 'local-signs'. Later research has rejected the hypothesis of 'sensory centres', as the two-point-threshold is susceptible to training and is largely reduced with practice. The modern view is that each point on the skin has its own distinctive 'local-sign', which is made up of the pattern of associated kinaesthetic experiences.

object is in the visual field. It is also perceived by the skin, when the moving object is in contact with the skin. Visual perception of movement requires that the stimulation of one point on the retina should continue and coalesce or get mixed with the stimulation of the neighbouring points. Thus the same object can stimulate two different points or sets of points on the retina at the same moment, and be known as present in two different positions in space. But the intensity of the said excitations will be different. This will point to the direction of the given movement. The moving object will be going in a direction from the earlier (and weaker) excitation point towards the latter (and relatively stronger) excitation point.

The tactual perception of movement also requires the stimulation of neighbouring points on the skin so that the impressions from point A get mixed up with the succeeding stimulation of the point B. In short, the basis of the perception of movement is the joint experience, at one moment, of two impressions of a given object from two different points in space. It is quite possible to give a tactual illusion of movement by rapidly stimulating a series of points on the skin about one inch apart from each other, by a quick alternation of the pressures of the finger-tips. In the case of the eyes too a sufficiently rapid stimulation of alternative points on the retina, leads to a visual illusion of *apparent* movement. Movement seen on a cinema screen is an illustration of apparent movement, or the Phi-movement. Each picture on the screen is slightly different from the preceding one, but each represents the objects or movements at different moments. Each picture is static, but as nearby points on the retina are stimulated in quick succession (about 32 times per second), the streams of nerve processes get combined in the brain, and the observer enjoys an experience of movement in the visual field. This knowledge of movement



is contributed by the mind ; it has no counterpart in the stimulus world : in short, it is subjective and apparent.

### 13. *Association of ideas*

All our experiences of objects are connected together. But some connexions are stronger than the others. For instance, I go to a garden and see all kinds of flowers and trees, men and women. I also meet a friend after a long time and discuss an important and very interesting topic, such as his sister's marriage. Due to this interest, my experience of the garden will be more strongly connected with my experiences of the friend and his talk than with the other objects. So the idea of the garden will also be more intimately connected with the idea of the friend. Hence, on a later occasion, if the idea of the garden comes to my mind, it will also bring along the ideas of that friend, and his talk. In this case we have a number of ideas associated together, so we can describe the process as that of the *association of ideas*.

There is a law of mental activity known as *the law of association*. This says that if we have experience of two objects A and B, then the connexion or bond between them persists when we experience them as ideas. An object may be observed together with many others on different occasions. So the idea of an object may be directly connected with a very large number of other ideas, and through them indirectly to an innumerable number of ideas. However, in our experience one idea does not bring all the host of these associated ideas. It brings along only such ideas as are very intimately connected with the given idea. For instance, usually the idea of a chair leads to that of a table ; pen to ink ; and day to night. If we remember that many of our words are the names of objects, or classes of objects, then it is easy to agree that the connexions between ideas may be known

or guessed from the observation of association between words. So experiments on the association of ideas are often described as experiments in word-association. Suppose you hear the word 'London', then along with the idea 'London' there may occur the idea of 'England', and the word 'England' may come to your lips. Then you can say that in your mind the idea of 'London' is associated with the idea of 'England'. There may be many kinds of relations between the associated ideas, e.g. similars, opposites, part-whole, cause-effect, etc. If someone is talking about an intelligent boy, then we may have the idea of another intelligent boy (i.e. similar idea), or we may start talking about a dull boy (i.e. opposite). One thing is, however, clear; that the *associated ideas are so connected merely because they have been together in our experience*. We have noticed them as objects, and so connected them together in our minds. I see a good player of cricket, L, at one time. After some time I see another, M, playing good cricket. The observation of 'playing good cricket' brings the two together in my experience. M leads to the idea of L. Again, suppose I see N playing cricket badly. The fact of 'playing cricket' combines in my experience the bad player N, with the good players L and M.

The name of a part may bring to mind the ideas of the corresponding whole. The sight or talk about a soldier may lead us through association to ideas of an army or a talk about the army, of which the soldier is a part. Again, the sight or talk of 'fire' may lead to ideas of 'smoke' or 'destruction' caused by it; and ideas of the latter may recall the former. There is hardly any relation of objects in this world that will not find an example in the world of association or associated ideas. So it is not at all easy to classify them according to the kinds of relations represented among them.

Sometimes instances of the association of ideas are

divided into two *forms*. If the associated ideas come at the same moment, then we have a case of the form of *simultaneous* association of ideas. For example, when I have an idea of Mr P, I also at the same time have ideas of Mr P's clothes and face. But if the associated ideas appear one after the other, we have a case of the form of *successive associations*, e.g. the idea of iron leads to the ideas of hammer, nails, picture, etc. A series of successively associated ideas is called a *train of ideas*. We may observe a flower or a building, a smell or a colour, and start on a long train of ideas, building fond castles in the air. Such trains of ideas are sometimes used by mental doctors for finding out the origin and nature of certain mental diseases.

Some psychologists hold that we can also recall associated affections or *affects*, desires and movements. For them the law of association is not limited to the ideas, but extends to any two mental processes that have been experienced as *related* to one another.

## QUESTIONS AND EXPERIMENTS

1. What is a perception?
2. What are the characteristics of perception?
3. How does perception develop? Describe the different stages.
4. What is apperception? In what sense can we say that every perception is an apperception?
5. Is the process of perception an analytic or a synthetic activity? Or is it both? Illustrate your answer with a suitable example.
6. What is an illusion? What is a hallucination?
7. What is an idea? What is the association of ideas?
8. What is the law of association? Write short notes on simultaneous association, and successive association.
9. Write down any ten words. Now write the first associated word that comes to your mind, on seeing each of them. Is there any relation between the given and the associated word? Try to explain them as cases of the law of association.
10. Below is a list of pairs of words. On seeing the first word of

the pair you begin writing associated words till you reach the second word of the pair :

- |                               |                               |
|-------------------------------|-------------------------------|
| (a) House . . . . school.     | (d) Sunshine . . . . wedding. |
| (b) Examination . . . . ship. | (e) Sleeping . . . . picnic.  |
| (c) Flower . . . . rat.       | (f) Rent . . . . Gandhi.      |

11. Compare and contrast perception with an idea.

12. How do we get perceptions of (a) time, (b) space, (c) movement ?

## Chapter VIII

### EMOTION

#### 1. *General*

We have been discussing *perceptions* or cases of complex cognition. We have also discussed feelings which may be supposed to indicate the affective side of sense-experience. In the same way a complex kind of affection or feeling is noticed along with certain complex perceptions. This is the experience of *emotion*. For instance, if a man is sitting with a friend of his childhood days, and the latter calls him an 'old fool', or an 'old rogue', etc. he will not feel hurt, or attach importance to such terms. But, if the same man is sitting with his office colleagues and in the course of an argument somebody calls him a 'fool' or 'rogue' or 'cheat', and he considers that an 'insult' in the given company, he will feel a complex kind of affection. He feels the emotion of anger and expresses it in various changes of his face, speech<sup>1</sup> and bodily activity. There are a number of well-marked affective experiences or emotions described in common speech, e.g. fear, anger, joy, sorrow, shame, hope, etc.

#### 2. *The formation of emotions*

When we observe any object or event, we also get a number of associated ideas. If we observe a number of objects as connected in a manner interesting to us, then each of those objects, and their relations, also give us a number of associated ideas. Now each of these objects, relations and ideas has an affective aspect. So a combination of these *affects* will give rise to a complex experience of affection, or emotion. Supposing a man is walking in a street and he sees a bull rushing at him from the other end of the street. The man knows he is in a dangerous *situation*, and *feels fear*. He does not simply

see a running bull in a street, but he finds himself in the same street ; and some consciousness of this relation of the complex situation by the observer brings about the emotion of fear. His experience, on analysis, would show perceptions of the bull and the street ; perception of the relations (i.e. distance) between the bull and himself ; his own position and the other end of the street ; ideas of danger, and the means of escape ; associated ideas of situations observed, or heard about, where bulls become dangerous in streets, and so on. Our analysis gives only a bare outline of his consciousness for the moment. However, we may note that if he experiences the various perceptions or ideas, one after the other at long intervals, then the affects cannot be very strong or complex at any one moment. But if all the perceptions of the objects are noticed at once as a *situation*, and if all the associated ideas also occur at the same time (i.e. simultaneously), then certainly the observer will be affected in a very strong and complex manner.

The objective situation must be intimately connected with the observer in the situation, to give rise to an emotion. If a man, standing in a safe position in a house, sees a bull running along an empty street, there will be but little intimacy in the connexion in the observer's mind between the activity of the bull in the street, and his consciousness of his own safety. However, if a couple of his hand-bags are in the street, apprehension for their safety from the on-rush of the bull would cause a warmer intimacy in his consciousness between himself and the observed situation. Again, if the street is being crossed at the same time by a small child, perhaps his own, the intimacy would be of a much stronger degree. To take another example : when we see dogs barking and fighting at a considerable distance from us, we seldom feel much emotion. But if any of them were to bark at or chase us, we would experience fear, toning up our consciousness



of the changing situation. In short, *the observed situation must be appreciated as intimately concerned with the observer.*

Further, if the man in the given situation is prepared to act beforehand, then his perceptions will directly lead to actions, and there will be practically no experience of fear. But if the preparation fails at the proper time, or if the man is unprepared to act, then there is a strong emotion, which may lead to unusual activity, or inactivity.<sup>1</sup> If while walking in a lonely spot a man suddenly sees a snake in front of him he is likely to feel fear. But if he has already heard of the snake, and goes armed with a gun to destroy it, then on seeing the snake he does not feel fear, but takes aim and fires the gun. So we notice that *emotions are experienced in a state of unpreparedness to meet the situation.* Because we are not prepared, the situation, coming suddenly upon us, overpowers us at once, and colours the whole of our consciousness for the moment with an emotion. The fact that the situation has such a striking quality as to immediately overpower us indicates that we meet it in a *state of passive attention.* We may recall that active attention and strong affection are never present together in consciousness. Thus, during an emotion, instead of clearly observing the different details of the situation by the activity of attention, we consider it vaguely as a whole and our attention is passively attracted by its different aspects.

We know that each mental experience has all the three aspects of cognition, affection and conation. In the case of emotion, while affection dominates the total experience, it has intimate relation with the processes of knowing the given situation, and the actions occurring at that

<sup>1</sup> Unusual activity or inactivity is met with in those cases where a man wins a chance fortune, or loses his dearest relations in a chance disaster.

time. Hence, we may sum up by saying that an *emotion* is a *complex* affective state which arises on the *perception* in a state of *passive attention* of a complex situation, directly related to the observer, enriched by a large number of *simultaneous associated ideas*, while he is *unprepared* to act.

### 3. *The bodily signs of emotion*

We noticed that affections have their bodily condition in certain general changes in the speed of (i) respiration, (ii) circulation, (iii) bodily volume, (iv) muscular strength, and (v) electrical resistance. Emotions are complex states of affection. So they are influenced by all these changes, and a number of others. There are changes in the secretions of *glands*, and organic functions like digestion, excretion, etc. During anger or sorrow we find not merely changes in breathing, circulation, volume, and strength, but also perspiration, tears, brightness of the eyes, and a stopping or reduction in the processes of digestion. Because of the larger number of these changes, we should be experiencing a larger number of organic sensations, of course very intimately mixed up together. So *emotion* is sometimes described as an *affective echo* (or mental reverberation) to *massive organic sensations*. This is what we find in our own bodies during an emotion; and this is borne out by direct introspection. But when our friend is experiencing an emotion, we can easily observe a number of changes on his face, and the movements of his arms and legs. The direction of his bodily movements towards the objects in the situation also helps us to understand the nature of his emotion. If one man is running away from another, we think the former is afraid. But if he is running towards another, shouting abuse, then we know him to be running in anger.

The bodily changes in the *face* are so very well-marked, that we often talk about X as looking angry, Y as looking

afraid, or Z as looking happy. The reason is that there are many parts of the face to reflect an emotion, e.g. eyes, nose, lips, cheeks, forehead. So the face can show a large variety of changes. The eyes may shine with joy or get dimmed with grief; the nostrils may expand or contract with anger; the lips may smile, curl or sneer; the cheeks may gain or lose redness, and may be drawn in, or extend outwards. The forehead may show a number of lines; the eyebrows may contract upwards, or fall; the mouth or speech may indicate various tones of the voice, as loud, feeble, harsh, cringing, or humble. A good example of the physical effects of emotion is given in the *Bhagavadgita* describing Arjuna's condition before battle: 'My limbs quail, my mouth goes dry, my body shakes and my hair stands on end. [The bow] Gāndīva slips from my hand and my skin too is burning all over. I am not able to stand steady. My mind is reeling.'

#### 4. Theories of emotions

The bodily changes are so intimately related with emotions that some scientists believe that *our emotions are the bodily changes*. They think it is not that we first experience fear and then run, or feel sorrow and then weep; but that our running is our fear, and our tears are our sorrow. This view was put forth by Prof. W. James, in America. It was also described by a Dutch medical worker, C. J. Lānge. So it is known as the James-Lānge theory of emotions. It lays stress over the large part played in the emotional experience by the organic sensations. Conscious emotion is due to the activities of our muscles, glands, and tissues deep within the body. It is specially caused by the various nerve-impulses flowing to and from these organs. This view, however, is not accepted by everyone. Some physiologists have tried to test this theory by cutting away all nerve connexions of the autonomic nervous system. They found that such

animals continue to show behaviour signs of anger, fear, etc.

Dr W. B. Cannon thinks that the function of the emotions is to deal with an emergency. For example, muscular strength during anger helps a man to fight. This is due to the activity of the adrenal glands, which is controlled by the centres in the thalamus. The conscious experience of emotion is thus primarily due to activity of the thalamus. Dr P. Bard also supports these views, so this is called the Cannon-Bard theory of emotions. This shifts emphasis to the older centres of the brain. But there are some bodily changes whose usefulness is not yet established, e.g. trembling during fear, or blushing during shame. Some of the bodily changes during emotion in men are also found among the lower animals. The curling of the lips in a sneer among human beings is similar to the baring of the teeth in a snarl by a dog or tiger, when it is getting ready to attack. This is the view of the 'evolutionists'.

### 5. Moods

An emotion rises suddenly, but it does not remain at the height of intensity for a long time. Our anger flares up in a moment, but it does not remain at the same pitch for many minutes. It becomes greatly reduced in strength after some action has taken place, e.g. rebuking or fighting. But in this reduced condition it remains with us for a considerable time as a *mood*. In other words, an emotion after passing leaves us in an affective *mood*. Our *anger* leaves us in an *irritable* mood. So a mood is described as the after-effect of an emotion. This after-effect is both bodily and mental. The massive organic changes during emotion take some time to return to normal activity. During this period of abnormal organic activity, the mental experience is that of a 'mood'. Sometimes due to peculiar bodily conditions we may develop a mood,

One morning we wake up feeling very fresh and confident ; on another we wake up dispirited and diffident ; on another we feel quarrelsome and fly into a temper at the slightest opportunity. So we can say that a mood is related to some persisting organic condition, which may be physiological or chemical, or the result of an emotional disturbance. Drugs that produce changes in bodily activity sometimes give rise to characteristic moods. Alcohol can make a man cheerful or pessimistic.

Moods often give rise to their corresponding emotions. If we are confident, then we find hope in every situation ; if happy, we enjoy even a little pain or injury, e.g. at a picnic party. So the moods are described as 'emotions long drawn out'. This statement tries to express the relation between an emotion and its mood. But the mood is not simply an emotion of less intensity, and there are a number of interesting differences between a mood and an emotion : (i) We have already noticed that an emotion passes away in a few moments, but a mood lasts for a much longer period. (ii) The emotion is very strong but the mood is often subdued. (iii) An emotion is always directed towards some definite object in a situation, but a mood is not directed towards any definite object. We are angry with an insolent person, we are afraid of the bull rushing at us. But when irritated or in a mood, trivial things can be annoying ; the tick of a clock, the tapping of a branch against a window pane, and even small changes in the usual position of furniture in a room. In short, the mood has no special definite object, but it has a tendency to fasten upon any normally indifferent object or accident, and burst into an emotion.

#### *6. The classification of emotions and moods*

Emotions and moods show a large number of variations ; it is extremely difficult to arrive at a satisfactory classification. But still certain characteristic emotions

can be noticed. These have been described by Titchener. We agree that in some situations the emotions refer more to the object, e.g. anger, and in others they refer more strongly to the subject, e.g. joy; but it is not necessary to describe here all the introspective curiosities he discusses. He has tried to give us pairs of pleasantly toned and unpleasantly toned emotions. Given below is Titchener's list of 'emotions' and their corresponding moods.

(The more objective forms are printed in italics.)

EMOTIONS				MOODS
1. Joy	..	..	..	Cheerfulness, hilarity
Sorrow	{	<i>care</i>	..	<i>anxiety</i>
Grief		melancholy,	..	dejection, gloom,
		wretchedness		depression

(Mood of indifference to joy and sorrow is composure.)

2. Like	..	..	..	Content
Dislike	{	<i>hate</i>	..	<i>annoyance</i>
		loathing	..	discontent

(Mood of indifference, *unconcern*.)

3. Sympathy (for others), friendliness, kindness, affection, love.

Sympathy (for oneself or others)–

{	anger, wrath	..	..	retaliation
{	contempt	..	..	superiority

Antipathy	{	<i>aversion</i>	..	..	<i>irritability</i>
		chagrin, mortification,			sulkiness
		exasperation, rage, re-			sentment, baffled anger,
		impotence	..		vexation, soreness

(Mood of indifference, apathy.)

4. Attraction, delight	..	..	Happiness, <i>charm</i>
Repulsion, repugnance, hor-			Dissatisfaction
ror, disgust			



(Mood of indifference, insensibility.)

5. Hope, eager anticipation	..	Sanguineness
Fear	{	
<i>terror</i>	..	apprehension
<i>dread</i>	..	<i>uneasiness</i>
6. Satisfaction, abundant satisfaction	.. ..	Equableness
Disappointment, despair	..	Sourness
7. Surprise (astonishment, amazement)	.. ..	Wonder
8. Relief	.. ..	Confidence
Alarm	.. ..	Vague discomfort, consternation

Titchener himself admits that his classification is not complete. We have mentioned it just to show certain obvious drawbacks that appear in any attempt at a classification of emotions, moods, etc. Few will agree that 'sympathy' which is experienced as 'contempt' is very different from the group of 'dislike' experienced as 'hate' or 'contempt'. Further, each emotion of joy or sorrow, etc. has intimate connexions with sympathy for oneself, since the situation in an emotion is intimately concerned with the observer. Thus this list also shows clearly how difficult it would be to distinguish the various emotions, and their different forms in different situations. The anger at an insult is different from the anger at the traffic policeman who stops us when we are in a hurry. The joy of reading poetry is not the same as the joy of meeting a friend, or of being charitable. Some emotions seem to be more *complex* than others, e.g. Hate=anger+fear. So we personally believe that the classification of emotions is practically impossible. However, we agree that there are a few typical emotions which can be distinguished in common experience. These are the emotions of (i) anger, (ii) fear, (iii) friendliness or love. (Sorrow and joy seem to be forms of fear and love.)

McDougall thought that the different emotions are definitely connected with different instinctive tendencies. His 'instinctive tendencies' may be described as natural impulses affecting 'the relation of the individual to his situation'. A pet dog, when hungry, will get angry if you try to snatch its food. The satisfied dog may enjoy a tug-of-war with you. The nature of the emotion, therefore, depends upon the instinctive tendency of the moment. McDougall's theory is useful in explaining the cause of emotions. It is not so useful for explaining the nature of the emotions. He tries to estimate the utility of the bodily expression to explain the nature of an emotion. The bodily expression is useful to the instinct that is active. Thus the activity of fighting is supplemented by the emotion of anger; and both are the results of the 'combat' or 'pugnacious' instinct. The bodily movements of flight, and the emotion of fear, are in the same way derived from the instinct of 'escape'. However, there are many kinds of bodily changes, whose usefulness to the animal is rather uncertain, e.g. 'blushing' during shame; 'death-feint' or inability to move in the case of some animals during fear.

### QUESTIONS AND EXPERIMENTS

1. What is an emotion?
2. How is an emotion formed?
3. What is the bodily expression of emotions?
4. What is the relation between emotions and a state of preparedness? And between emotions and the state of attention?
5. What is (a) the James-Länge theory of emotions? (b) How does the Cannon-Bard view modify it? (c) What do the 'evolutionists' say about expression of behaviour.
6. What is a mood? Has it any definite object?
7. Write down your mental changes in a case of (a) anger, (b) fear, (c) joy, (d) sorrow, (e) shame, (f) disgust, (g) wonder. Describe the situation, and the development of the emotion.

## Chapter IX

### MEMORY AND IMAGINATION

#### 1. General

I saw a friend yesterday, and enjoyed some tea and conversation with him. Today, when my friend is not present before me, I can remember, that is, I can get images of my friend, the images of words, or ideas of his talk, the images of the tea-table, and cups. Each of these images, however, has a particular reference to a past time—yesterday. Thus they carry a *mark of familiarity*. All images are experiences of internal excitations but only those images that have a reference to some past experience are to be called *memory images*. Suppose I have the image of a mango and there is no reference to past experience; then I have a simple image. But if I have an image of the mango I enjoyed at some particular past moment, I shall have a memory-image.<sup>1</sup>

If we see a man again, and our perception is mixed up with memory-images, we shall then know that man as having been present in our past experience also. In other words, we shall *recognize* the man (*re*=again; *cognize*=to know). When the image of an object comes to our mind, and contains a reference to our past mental experience, we are said to *remember* the object. But when an object is presented to our sense-organs, and we remember having observed it before, we are said to *recognize* that object. Both 'recognition' and 'remembering' imply that the experience carries an element of familiarity, which is a more or less definite reference to the past. In the case of 'recognition', this back-reference is attached to some sensory aspect of the object or situation before us. We hear a sentence and recognise

<sup>1</sup> In a wider sense, however, all images are memory-images.

certain words or names or tones. We open a knife, and recognize its stiffness (or looseness). We see a flower, and at once recognize it as a rose ; or we may not recognize it, if it is unfamiliar. In the case of 'memory', the 'back-reference' is attached to an image, or a group of images and ideas. I hear the word 'Simla', and get a memory-image of the hill-station. I meet an old friend, and we remember my old class-mates, teachers, sports and pranks.

Wrong or illusory recognition is called *paramnesia*. For instance, sometimes we meet a man and think that we have seen him before ; but on asking him we discover that we are mistaken and have never met him before. Here our perception is mixed up with memory-images associated with certain features of the man and these lead us into an illusion. On another occasion we may notice a person as vaguely familiar, without thoroughly recognizing him. Here the associated ideas do not bring in enough details to make our perception a complete recognition. But when the associated ideas bring in full details of *when* and *where* we observed the object, there is immediate recognition. The object is a *familiar* object. So the number and clearness of the associated ideas determine the degree of familiarity possessed by the object. Hence we may say that the associated ideas make up the 'mark' of familiarity. But the mark of familiarity also carries a pleasant feeling—the *feeling of familiarity*. The feeling of *strangeness* is an unpleasant, uneasy feeling (cf. p. 68).

## 2. *The part-processes of remembering*

In every case of remembering, the object was first experienced in the past. The experiencing of a perception in the past is only the first step or stage in the process of remembering. The first experience of drinking tea with my friend was not merely experienced, but it was also kept (or *retained*) somewhere in the brain or mind, till it was remembered. The fact of remembering also shows

that the impression was not merely retained, but that it was capable of being *reproduced* or recalled to mind. If the impressions of the perception on the central nervous system or brain can be reproduced, we have the experience of recall. If the impression is very faint, then an effort to recall some associated objects, events or experiences often re-excites the said nerve-connexions, and revives the past experiences. Some believe that the old nervous pattern is retained as a whole (a neurogram). Others think that a similar pattern is reformed and excited. The easiest way to understand retention is to consider it as a natural function of the brain centres.

We may mention that our recall of an object is enriched by the recall of a (more or less) large number of associate ideas, which make up the mark of familiarity and enable us to *recognize* our present ideas as copies of past experiences. In short every fact of remembering is the result of the activity of a number of processes of (i) original observation or *reception* of the stimulus-object; (ii) the *retention* of the received impression; (iii) the *reproduction* or recollection of the retained impression and its associated processes;<sup>1</sup> and (iv) the *recognition* of the reproduced impressions and associated ideas or the mark of familiarity. Each of these processes may therefore be described as *part-processes* of remembering. So the efficiency of an act of memory will depend upon the efficiency of these part-processes.

### 3. The good memory

The good memory is therefore one that is good in one or more of these part-processes. (i) The good quality of an *observation* consists in the *time* taken for obser-

<sup>1</sup> The recall due to memory is to be distinguished from the recall of associated ideas. Associative recall can go further back in the past than memory. So we may get associated ideas that have lost all traces of the mark of familiarity. This method is used by some mental doctors called *psycho-analysts*.

vation, and the *number* of the details or relations noticed within a complex situation. The less the time taken, and the larger the number and clearness of details noticed, the better is the observation. (ii) The good quality of *retention* consists in the time or duration for which the retained impressions remain in a state of readiness for recall (or reproduction). If a man learnt a poem at the age of five years, and can easily recall it at the age of thirty-five, then he has better retention than another who having learnt the same poem at the age of five cannot recall it after a period of ten years. (iii) The good quality of the process of *recall* or *reproduction* depends upon the *time* and *effort* taken for reproduction of the impressions, and the *number* of the associated ideas which can be reproduced at the same time. The good recall takes less time and contains a large number of clear details and associate processes. (iv) The good quality of *recognition* depends upon the *confidence* and the *accuracy* of the process.

The good quality of memory as a whole also depends upon the factor of its *success* or *failure*. If our reproductions are useful and if they occur on the right occasions, then we have a good memory. Two men may learn by heart the same book of poems or proverbs. But if one of them can use in an examination his memorized materials, then his memory is good for him ; but if the other cannot use his memory at the proper places in his essays or answers, then his memory is not a good one. A memory which is not *serviceable* is useless. A person who cannot utilize his memorized facts or materials, is in the words of a poet, 'a learned block-head, with a load of learned lumber in his head'. So *serviceableness* is an important test of the goodness of memory.

#### 4. *The improvement of memory*

The improvement of memory means the improvement



of one or more of the part-processes into which an act of remembering can be divided. The improvement of the different processes is not possible to the same degree. The process of *recognition* can be improved only to a very small extent. A botanist or zoologist shows an improvement in his recognition of plants or animals as a result of practice. The improvement in confidence is negligible, while that in accuracy is noticeable. But that is certainly due to the improvement of his knowledge, or original reception of the said materials. So we conclude that there is the possibility of only a slight improvement in the process of recognition.

The process of *reproduction* can also be improved to a certain extent. A man may learn or develop a method of recall. If a word is to be recalled then he may start systematically with words beginning with an A, and then with a B, C, and so on through the alphabet, till he gets his word. Thus he may take less time, and show an improvement. But methodical recall will be most successful in those cases where the same method was used in the original act of learning. There are many methods of systematic observation, but each of them must first be developed, and the materials should be memorized in the same order. It is a common fact that a primary student can orally tell us the results of  $4 \times 13$  (four times thirteen),  $5 \times 14$  (five times fourteen), but he often makes mistakes if asked  $13 \times 4$  (thirteen times four) or  $14 \times 5$  (fourteen times five). The boy has learnt his arithmetical tables in a certain order and so can reproduce them in the same order. Hence any improvement in the process of reproduction can only be slight, and depends upon the use of systematic observation.

The process of *retention* is generally believed to be a physiological process. When we observe any object or situation, then our brain receives the impression as a peculiar pattern of excited nerve-combinations. If these

nerve-connexions are very strong, then the pattern will be easily reproduced at a later date; just as a cloth can be folded back along the old lines. So retention is a quality of the brain, or the nervous system. Some persons have brains like marble, and keep the patterns of their impressions for a very long time; others are like sand, and lose them in a short while. So an improvement in retention is not possible by practice. But an improvement may be noticed if there is any general physiological change in the condition of the brain or the nervous system.

The process of *receiving the impression* is one that can be improved to a great extent. There are various methods of study of the object. The better methods are those that help us to receive the impressions more clearly. *Observant study*, or attentive study with clear impressions of the relations between the different facts in the situation, is decidedly better than non-attentive study. *Recitation and reviewing* not merely *save the time* taken for learning a task but also make the *impressions last for a longer time*. The method of *studying a subject as a whole* usually shows better results than the method of studying the different parts separately. This is specially clear when the task is meaningful, a piece of prose or verse. Four lines of verse are easier to memorize than four lines of prose. While the latter are easier than two lines of disconnected and strange scientific terms. We all know that we learn a book or a poem after a few revisions. It has been found that instead of having all (say four) revisions the same day, it is better to have each revision after a few days; in fact it is better to have *spaced* readings, and *whole readings*.

A simple explanation of the above can be given in terms of nerve-connexions, or memory-bonds. Suppose a task is divided into four parts  $A \rightarrow B$ ;  $C \rightarrow D$ ;  $E \rightarrow F$ ;  $G \rightarrow H$ . Now if the student goes on revising  $A \rightarrow B$  till this part is learnt, the memory bonds are

formed between A and B, and also  $B \rightarrow A$ . In the same way among the other parts we get connexions  $C \rightarrow D \rightarrow C$ ;  $E \rightarrow F \rightarrow E$ . So when the student learns the whole task, he has (i) to make new connexions between  $B \rightarrow C$ ;  $D \rightarrow E$ ;  $F \rightarrow G$ ; and (ii) to break the old bonds between  $B \rightarrow A$ ;  $D \rightarrow C$ ;  $F \rightarrow E$ . This takes considerable time, and often leads to confusion. So learning a task as a whole is better than learning by parts.

Further, it is well known that muscles improve if they are given intervals of rest after work. The same rule applies to the nerve-connexions, they also improve after suitable periods of rest. For this reason also *spaced* readings prove better than continuous revisions.

#### 5. *Passive memory and active memory*

There are many cases where the process of remembering is entirely effortless, or passive. Sometimes past experiences of school, sport, or the family come of their own accord to our mind. These are the cases of spontaneous or *passive memory*. We are in a state of passive attention when these memories come to us. But there are occasions when the name of a school-companion, or a teacher, is not easily recalled. We have to make an effort to collect the ideas that make up its mark of familiarity. We are in a state of active attention, and the ideas come one after the other (i.e. successively). So such experiences are described as processes of *active memory*.

#### 6. *Direct apprehension*

There are some objects which become very familiar with long practice. So the mark of familiarity is no longer necessary or useful for recognizing and knowing those objects. Supposing I buy a new pen; for some days almost each perception of the pen will be mixed up with memories of the shop where I bought the pen, the selection of the pen, the appreciation of some friends, etc.

These ideas are necessary to make me recognize that pen as 'my pen'. But after considerable experience of that pen, the mark of familiarity becomes useless. So it is dropped out of consciousness and I know the pen directly as 'my pen'. Now the knowing of the pen is a case of *direct apprehension*. When we learn a new fact, say a relation between two facts like a word and its meaning, then at first we remember the meaning with an effort of attention. If the same meaning is recalled on many occasions, then we do so in a state of passive attention. The moment we recall the meaning it is accompanied with some 'mark of familiarity'. But if the word is used hundreds of times, then the connexion between the word and its meaning becomes intimate and direct. The connexion with the mark of familiarity fades, as perhaps it is unnecessary, and we have a direct apprehension of the word. The readers of this book have a direct apprehension that  $2+2=4$ , the sun rises in the East, the Pole Star is in the North, their own names and family relations, etc. In no case will they have any 'mark of familiarity'; nor can they tell us when they first learnt either of the above facts. The development of 'direct apprehension' is also an example of nature's economizing of mental energy.

### 7. *Passive and active imagination*<sup>1</sup>

If we experience *images without any mark of familiarity*, then these images are distinguished from memory-images and described as images or the images of imagination. For it is these images, independent of any reference to our past experience, that play the main part in imagination. Many times these images come to us without any effort on our part and form interesting pictures and events; but sometimes we make an effort to combine

<sup>1</sup> The reader should revise the topic on Images (p. 57).

images into new and interesting scenes or occurrences. While we are reading an interesting novel, the various scenes described by the author come to our minds without any effort on our part. Here we have no objects present before our sense-organs and no excitation (or stimulation) of sense-organs, but we have experiences of seeing, hearing, and moving events, so we are enjoying the processes of imagination. Further, the fact that these images come to us without any effort on our part, leads us to describe them as processes of *passive imagination*. But if we try to write a short story, or describe a picnic, then we have to make an effort to keep before our minds the various characters of the story. The effort becomes all the more sharp when we want our images to change, and behave according to our own plans of the story. This combination of image-processes (or imagination) with an effort is called *active imagination*. Sometimes it is also described as *creative imagination*, for the effort of combining images creates a new experience. Passive imagination is usually playful and *recreative*. But active imagination is a task and sometimes it may prove quite laborious and painful. Passive imagination is noticed sometimes when we indulge in day-dreams and build castles in the air. These wish-fulfilling fancies are not of much use to us, or our society. Creative imagination, on the other hand tries to achieve a real object and give real satisfaction to the person concerned.

#### 8. *Memory types, or types of imagery*

Objects can be perceived in many ways. I can see a book, touch it and hear the noise made by the same book as it falls to the ground. So I can use a number of sense-organs for knowing the same object. For this reason, I may recall the book as a seen thing, a touch, or a sound with the help of images (i.e. as images of sight, touch or hearing). It is a common experience that we can recognize

objects by sounds, e.g. the movement of a chair across a floor ; the footsteps of a man, woman or child. We can also recognize by touch chairs and tables, just as we can recognize by sight, specially when we move in the dark. Now, when different persons recall different objects, some may experience *only* one kind of images, say visual images, others auditory images, others touch-images ; and others may sometimes get visual and sometimes sound or touch-images, that is, a mixture of all kinds of images. The memories of the first group are in pure visual images, so they are called *eye-minded* ; those of the others are in pure auditory, or pure touch-images, so they are called *ear-minded* and *touch-minded* respectively. But the members of the latter group experience all sorts of images, so they are described as belonging to the *mixed memory* type. There are also a few persons who remember objects through the recall of words ; they get images of words or *verbal images*. This group normally includes old and learned scientists, whose imagery is poor, but whose knowledge of language and technical terms is very deep and extensive. These verbal images again may be either experienced as seen words, heard words, or as movements of some parts of the speech organs, while speaking the words. So we have the verbal images divided into visual-verbal, auditory-verbal, or tactual-verbal imagery.

If a large number of men go to a theatre, then some of them may be purely 'eye-minded'. They will be able to recall the different scenes, actors and events of the story as visual objects. But they will not be able to compare later the sounds of a gramophone record with the words and tones they heard in the theatre. The purely 'ear-minded' persons will be able to recall the different scenes, actors and the events through the recall of sound-images only. They will be able to recognize the music, songs and tones, etc. of that performance, and note differences from others. But they will not be able to compare later the



features of the actors, the patterns of their clothes, or the visual details of the scenes with other men or pictures. The purely 'touch-minded' persons on the other hand will recall the scenes, the actors and the story through touch- or movement-images. They will be able to recall the actions during the scenes, but will not be able to compare the features of persons or objects, or the voices of their companions, with the scenes or sounds in the theatre. A person of the mixed type will be able to recall some scenes, actors and events as visual images, and others as sound and touch-images. He will use such images as are best suited to the nature of the objects or events observed by him. For example, he may recall some faces, clothes and decorations by visual images; some songs and words through auditory images; and a few actions and events with the help of tactual images. People of the *mixed memory* type are more commonly met with. Cases of purely visual, auditory or tactual memory are very rare.

We often take the help of *smell- and taste-images* in judging other tastes or smells, but they are of only minor importance in our daily business of practical life. So the use of smell and taste imagery is described as the *minor memory* type. We have organic sensations and perceptions also, but it is difficult to talk about an *organic memory image*. The memories of emotional experiences usually bring about a reproduction of the past organic state. When we recall the state of a hearty laugh, we often fall into the earlier organic state and enjoy another laugh, often equally loud and satisfying. Many people while talking about vomiting begin to feel nausea. So it is said that to speak of an organic memory is a mistake; for what we experience in these cases is an actual revival of an organic state, although it is not as intense as the original experience in the past.

As a simple test of the relative importance (frequency) of the memory-types in everyday life, six girl students of

the Intermediate Arts class were asked to write the names of objects they could recall by visual images, with a time-limit of four minutes. After an interval, they were asked to write the names of objects that could be recalled by auditory images, also within four minutes. Later, for other periods of four minutes they were asked to write the names of actions or objects that could be recalled by tactual images; and lastly any words that came to their minds. The results were as follows:

Individuals	A	B	C	D	E	F	Total
Visual images ..	28	19	13	17	19	20	116
Auditory ..	13	15	10	12	17	14	81
Tactual ..	17	7	14	8	13	11	70
Words ..	67	56	44	32	34	40	273
TOTAL ..	125	97	81	69	83	85	540

On another occasion a different group was given only two minutes for each kind of recall. The total results were: V. = 107; A. = 56; T. = 29; W. = 181.

A glance at the above table of results shows that all these persons have different kinds of images. That is, all of them belong to the mixed-memory type. In general the visual memory is better developed than the auditory, and the auditory is better than the tactual. However, there are differences among the different individuals: A and C have better tactual memories than auditory memories.

### 9. The limits of imagination

Can we imagine anything we please? The answer depends upon what you mean by imagination. If you mean the result of the combination of images, we may

say: 'Yes, in general we can imagine anything we please, unless there be a contradiction in the part-images'. We can imagine an animal with the heads of a lion and a sheep, the body of a snake, the legs and hoofs of a bull and the tail of a donkey. There are many such examples in myths and fables of all peoples. But we cannot imagine a man both tall and short at the same time, for these two images are contradictory. We can easily imagine a man grown to twice, or shrunk to half, his normal size, as in *Alice in Wonderland*; but our normal minds are of such a nature that they cannot imagine the same man appearing both tall and short at the same time. So the combination of images is limited only by the habits of our minds. It is fairly difficult, if not impossible, to imagine a full-sized elephant dancing on a normal pin-point; for the relative sizes do not seem to fit with our normal habits of knowing.

Further, as far as the parts that combine are concerned, our imagination is necessarily limited by our previous experience of the component parts. I can imagine an individual who is half man and half horse (centaur), for I know the part-images 'man' and 'horse'. In the same way I can imagine a mountain of butter, or a sea of milk. But having never seen a picture or read a description of them, I cannot imagine (or can only imagine imperfectly) the Neanderthal man, or the mysterious 'snow-men' of the Himalayas.

## QUESTIONS AND EXPERIMENTS

1. What is the 'mark of familiarity'? Describe two cases of objects differing in their degree of familiarity.
2. What is the difference between recognition and remembering?
3. What are the characteristics of a good memory?
4. What are the processes of remembering? How far can each of them be improved?
5. What is meant by passive memory and active memory?

6. What is an image of imagination? How does it differ from a memory-image?

7. What do you understand by passive and active imagination?

8. What is a memory-type?

9. What are the chief memory-types?

10. Perform the experiment mentioned in § 8 and discover your own memory-type.

11. Do you remember an anniversary, or a picnic? What kinds of images do you use? Decide to what memory-type you belong.

12. Put a drop of ink on a large sheet of paper. Fold the paper around the drop, and press it. You will find that the drop has left an interesting figure on the paper. Look at it for two minutes and write a short essay or story about it.

13. Indicate the stages of passive imagination and active imagination in the above case [Q. 12.].

14. How do you remember the facts referred to by the following questions? Mention the type of imagery employed:

(a) What is the lightest gas?

(b) Which is the highest mountain peak?

(c) What is the name of the largest animal?

(d) Whose cry is louder, the cuckoo's or the peacock's?

(e) What is a precipitous climb?

(f) Which is clearer, the noise of a motor horn, or the creaking of a loaded cart.



## Chapter X

### THOUGHT AND LANGUAGE

#### 1. General

The layman uses the word 'thought' in many senses. 'Thinking' is often used for remembering or imagining, e.g. 'I think his name is John'; 'I think I met you ten days ago on the playground'; 'I think we will have a good time in a house-boat at Srinagar'; 'I think he is busy, at this moment, arranging his drawing-room to receive you'. In the former two examples 'thinking' is used for 'remembering'; but in the latter two examples it is used for 'imagining'. But the science of psychology uses this term only in a restricted sense.<sup>1</sup> *Thinking* is the name for those *processes which occur when we try to solve a problem by the aid of past images or ideas*. Some of these ideas may be present in the form of 'memories of judgments'. If the images or ideas come to us without any reference to the situation or problem before us, then we shall be experiencing processes of imagination or memory, but not of thinking in the strict sense. While thinking we use our memories, including images and ideas, as tools for the solution of present situations. For instance, consider the simple question: 'A can do a piece of work in 6 days; B can do the same in 12 days; how long will it take both A and B to do the same task?' The solution of this question requires images or ideas about the abilities of A and B separately as well as jointly, and a comparison of the amount of the given task with their joint abilities to work. We find that the abilities of A and B are one-sixth and one-twelfth of the task per day. So a combination of their abilities is equal to one-quarter of the

<sup>1</sup> Some psychologists use the term 'thinking' in a very wide sense for all kinds of mental processes, e.g. W. McDougall in *Introduction to General Psychology*.

task per day. Hence, we conclude that the total task would be completed by A and B jointly in four days. How do we know what is the sum of one-sixth and one-twelfth? From our past experience, or knowledge of the way of summing and simplifying the fractions. Even when we write down the process as  $\frac{1}{6} + \frac{1}{12} = \frac{2+1}{12} = \frac{3}{12} = \frac{1}{4}$  we get  $2 + 1 = 3$ , and  $3 \div 12 = \frac{1}{4}$  as memory-images or 'direct apprehensions' (cf. p. 126). So we shall be employing visible marks on the paper only to help in controlling our processes of images and ideas, or memory.

If we recall  $3 \times 3 = 9$ , which has no reference to our problem, then this will be a memory-process that disturbs our thinking. Strictly speaking, it would be wrong to describe this recall of  $3 \times 3 = 9$ , while facing the fore-mentioned problem, as a thought-process.

## 2. Deduction and induction

The processes of thinking can be easily divided into two big groups: (i) We remember a general principle of law and apply it to a particular case. For example, we know that 'all men are mortal', and Socrates is a man; therefore we conclude 'Socrates is mortal'. This kind of thinking is described as *deductive argument*. (ii) We taste a number of red mangoes from a big basket and find them sweet, so we decide that all the red mangoes in that basket will be sweet. Here we pass from our knowledge of a number of instances to a judgement about a number of unobserved cases. Such cases of generalization from the known particulars are called *inductive arguments* or *inferences*. Every kind of thinking can well be described as a case of true or untrue inference by deduction or induction. Some thoughts may contain both kinds of inference. Supposing we know that light-rays bend when they pass through solid glass, then we can *deduce* that longer wave-lengths will be affected in a different manner



from shorter wave-lengths. If we are told or otherwise come to know that rays of sunlight are mixtures of various wave-lengths, then we can *induce* a beam of sunlight to pass through a glass prism. Thus processes of induction and deduction supplement and verify one another in a complex problem of thinking. Further, these two kinds of elements may be either quite clear or quite vague.

The processes of thinking are always connected with interests and purposes. They often carry feelings of *belief* or doubt. The conclusions drawn are at times faulty or false; they indicate bias or prejudices; or they may show carelessness or irrelevance.

### 3. *Comparison, abstraction and relation*

All inferences can be described as processes of a comparison of judgements. And these judgements are formed by the assertion or denial of a relation between ideas; e.g. 'Roses are red'; 'No form of good government can be a substitute for self-government'; 'If the weather is bright, then I will not stay at home'. So ultimately all sorts of inferences or thinking processes are made up of the relations, or combinations, or comparisons of ideas. (Usually the relations are between class-ideas or general concepts.) Hence the *psychology of thinking is the description of the processes and stages of concept formation*. As beginners we need know only the more common processes. These are, *firstly*, the *comparison* of a number of perceptions of similar objects, e.g. tables, books, etc. This process of comparison leads to an emphasis of the common features present in the different perceptions. *Secondly*, this emphasis later enables us to select or *abstract* those features out of their various surroundings. Table A differs from table B in some respects, say size and colour. It may differ from tables C, D, E, etc. in other respects, say form, height, age, etc. But in *each* of the tables A, B, C, D, E, etc. there are

some common features, or properties or qualities. Thus the variety of the individual's experience enables him to single out or abstract these common features along with others peculiar to that table. These abstracted features are then combined together and *thirdly*, distinguished by names. The process of distinguishing also implies the processes of *relation*. The table is related to the chair, books and man. Sometimes these processes occur without any effort on our part. We see A, and a moment later see B; if A is tall, and B relatively dwarfish, the comparison of the two occurs in a natural and effortless manner. In the same way, to decide the statures of A and B, we may deliberately notice the height of A, and actively or effortfully compare it with B's height. Abstractions and relations also may be passive or active, effortless or effortful.

At first a child gets experiences of particular dogs or fruits, etc. In a few months he discovers the prominent common features of each group. But he finds it difficult to distinguish dogs from cats, calves, etc. When he learns the words dog, mango, banana, etc. his ability to distinguish the class of dogs or fruits improves to some extent. Thus the addition of each class name, cat, calf, etc. will greatly sharpen his ability to distinguish dogs and cats, from one another. In the same way the learning of words improves the order or arrangement of his knowledge about other objects like fruits, men, etc. These concepts are class ideas.

The relation of ideas or concepts leads to the formation of *judgements*, e.g. roses are red; this chair is hard. A comparison of different judgements with some common ideas enables us to find new relations between concepts. If a concept M is connected with S, and also with P, then we can find a relation between S and P. In symbols, M-P and S-M can lead to an S-P. If monkeys can climb trees, and Jack also can climb trees, then we may deduce a

relation of similarity between Jack and a monkey. If we consider our mental processes during this act of reasoning, we shall notice the abstraction and naming of the conclusion. We may here compare the analysis or abstraction in the experience of perception with the thinking of the conclusion from the given premisses. They are similar in being processes of knowledge; only perception deals with objects and thinking with ideas.

#### 4. *Thinking and language*

The term 'language' is commonly understood as a system of communication by sounds. But it may also be taken to include any other means of communication, e.g. gestures or movements, and visible drawings or signs. A movement of the hand by one man may mean to another man 'come here', 'go away' or 'sit down'. Pictures of men, animals or objects may be used to convey news to those people who can understand the system of the pictorial language. The words written in a book convey thoughts to all those who can read and understand the script and the language. In short, language may be made up of heard sounds, or visible signs or movements. The information is received in the form of symbolic perceptions, or complex meaningful relations and references.

Words or gestures, used in language, can be easily seen to represent certain ideas or concepts. Combinations of such concepts give us judgements and inferences. Concepts, judgements and inferences are only different products of thinking. Indeed each word carries a meaning that, at some time, solved a problem for a person. Who is he? What is this? How are these related? Such queries are at the origin of simple names and words that carry various meanings. So when we say that 'Rama', 'chair', or 'son' are thoughts, we do refer to their original experience as attempts to solve problems. In

short, problems and ways of their solution are implicit in the meanings of words and symbols used in a language. So language may be fairly described as a communication of thoughts from one individual to another. But all sentences are not technically to be considered as thoughts. However, each of them can be represented by, and most of them are evidently results of, thinking processes. So we need not consider the view that language communicates any other kinds of events and activities besides thinking. For while the words are being communicated they have been more or less transformed into thoughts (concepts, etc.).

### *5. Development of language*

Even among primitive savages both audible sounds and visible signs are used for the communication of thought. But in a life spent in hunting, or flock-grazing, or crude agriculture, the individuals may be at a distance or hidden from each other by trees, bushes, etc. In such situations the spoken sounds are more useful for communication with other members of the group than the visible signs or movements. (i) It is easy to distinguish objects by the use of different spoken words, e.g. cat, dog, wolf, bear; but it is very difficult to clearly express the different animals by movements of one's own hands and feet. We require a very large number of gestures, and even then our description may not be very clear. (ii) In the dark, or when somebody is at a distance and hidden behind some object, sounds alone can be used for communication. The visible gestures are at an evident disadvantage. So gradually language is built up of spoken sounds and gestures are given a subordinate role, as aids in giving emphasis or supplementing the spoken words. Certain patterns of sound (words) are taken to represent certain objects. A connexion or custom is set up and objects are called trees, flowers, cats, dogs, men. The

combination of these spoken words into connected speech, and the expression of this speech by suitable scripts, developed at a much later stage. We can see this development on a small scale in the case of every little child. He first learns words, then spoken sentences and, last of all, the method of expressing words by written patterns of straight and curved lines (letters). Many grown-up persons use both speech and gestures. Very few people indeed use pure speech without employing any supplementary gestures. In common communications, gestures are as important as an alteration of tones for conveying meanings, over and above the usual or normal sense of the words used in speech.

#### 6. *Imagining in words*

Suppose we try to think of any simple problem, e.g., How far is the station? Is it going to rain? What is the sum of 4 and 5? Then the answer usually comes to us in the form of a word, or words. And if we refuse to use words to solve these problems, we find it very difficult to find out the answers. If we do not make use of words for the recall of ideas in these problems then our images prove inadequate to a great extent. So, many psychologists believe that words are necessary for thinking. They say *thought is implicit speech*; that is, we are speaking to ourselves (though not aloud) during thinking. In other words, thinking is a process in which we actively try to combine words, or thought is 'active imagination carried on in words'.

But the use of words during thinking does not mean that we do not employ any other images. Often we do employ images as well as words. And there may be a few parts of every thinking process, where we experience neither images nor words. If anybody asks me, 'How much have you read of the book I gave you yesterday?', the understanding and the answering of this problem

take the shape of images, words and *imageless thinking* processes. In fact all complex relations and most abstract ideas are experienced as imageless thought processes. The relation of thinking with words is the most striking. Very interesting experiments have been performed to show that we make slight movements of the speech apparatus during thinking. It is also interesting to know that dumb people who use a language of signs, are known to make these signs while dreaming. Further, just as we often find ourselves thinking aloud, in the same way dumb people often show by the movements of their hands and fingers that they are thinking.

### *7. Relation between thought and language*

The relation between thought and language is very intimate. The development of language in a primitive group or a child is a sign of the development of its thinking. The development of thought by a poet or philosopher usually leads to a development of the language. A vague realization of this fact is probably the reason why poets, philosophers, and thinkers were held in high esteem in ancient times.

Language or the use of words, is a great help to all thinkers. The words enable them to conveniently deal with their problems and ideas. Abstract ideas or thoughts can be easily connected, combined and arranged into systems of thinking, with the help of words. We can discover new thoughts or shades of meanings by learning new words. A person with a large vocabulary has a wider acquaintance with the variety of thoughts than does a person with a knowledge of fewer words.

The relation between thought and language can be best described in the words of a famous British philosopher, 'words are the tunnels of thought'. He means that (i) thought can reach fresh fields, and higher planes by the use of words, as when we read a poem or speech



and feel enchanted, ennobled or uplifted by the magic of those words. He also points out that (ii) words help us to treasure our thoughts and keep them safely. Just as we can safely pass through a hill by a tunnel, knowing that the structure of the tunnel is strong enough to remain unchanged against the weight of the hill, so also thought is in safe keeping among words. Images and feelings mostly change a great deal with time, but the meanings of the words do not change so much. Further, (iii) words help us in the progress of our thinking. Just as by means of tunnels we can reduce the length of our journeys, so by the use of words we can easily fly from thought to thought. It is thus that poets and thinkers reach distant visions and gain far-reaching perspectives.

### QUESTIONS AND EXPERIMENTS

1. What is understood by the process of thinking in psychology?
2. What are the processes of deductive inference, and inductive inference?
3. How do you use the processes of comparison, abstraction, and relation in thinking?
4. Why is it said that thinking is the process of active imagination carried on in words?
5. What is the similarity between the processes of perception and thinking?
6. What is language? How may it be constituted?
7. How does a language develop?
8. What is the relation between thought and language?
9. Try to form a language by inverting the order of syllables in your normal language. Note how far you employ the processes of comparison, abstraction, relation and naming.
10. Draw two parallel lines: and then draw two lines cutting the parallel lines. Draw another figure of the same kind and put a point in each of the parts. Now you will have  $9 \times 2 = 18$  different part-figures. If you draw a cross, and another with a point between each of the lines you will have  $4 \times 2 = 8$  different pointed angle-figures.

$18+8=26$ . So we can use a part-figure for each letter. Try to write a sentence in these code-symbols.

A	B	C
D	E	F
G	H	I

J	K	L
M	N	O
P	Q	R

	T	
S		U
	V	

	X	
W		Y
	Z	

## Chapter XI

### LEARNING AND HABIT

#### 1. *Definition*

If you whistle to a dog and throw it a bit of food, then the dog will come towards you and eat that food. The first time it may hesitate a little, but after a few repetitions of whistling and food, the dog will begin to come readily at your whistle. We can describe this change in the dog's behaviour as the result of *learning*. We can say *either* that the dog has learnt that the sounds of your whistling will be useful to him if he comes near to you, *or* that the dog has learnt to lose his hesitation in coming to you. We can describe the learning of the dog in positive terms, e.g. learnt to come at your whistle; and we can also describe it in negative terms, e.g. learnt to lose his fear. In each case, we are trying to describe a 'modification of behaviour' as a result of the 'learning' experience. The same is the case when you learn cycling, or typewriting. At first you make some right movements, and a lot of wrong movements. But with practice you are able to make all the right movements, and lose most of the wrong movements. Your gain or loss is the result of your past experience. So learning may be defined as a *modification of behaviour as the result of past experience*. This definition will help us in understanding the learning of good as well as bad behaviour, of useful as well as useless behaviour. Learning is also frequently used to describe the development of some fixed response, or habitual mode of behaviour. Hence, the psychology of learning is intimately concerned with the formation and reformation of habits.

#### 2. *Habit*

The term 'habit' is usually understood, by an average

student, to mean the habits of smoking, drinking, gambling, etc. These are of course bad habits, but there can be good habits as well as bad habits. We may also develop habits of thinking, feeling or acting. Habits are not merely bodily phenomena, they are also mental phenomena. A man may be habitually in favour of capitalism or socialism, may be jovial or melancholy, persistent or otherwise. Habits are commonly understood to mean *practised* and *necessary* modes of behaviour. When a man cannot do without smoking or drinking then he is said to have fallen into the habit of smoking or drinking. Habits become a part of a man's nature, although he is not born with these ways of behaviour. So habits are also known as 'second nature'. They are a part of a man's *learned* or *acquired* nature. A child at first learns a behaviour, and gradually by practice he comes to form a habit of behaving in that way, that is, he begins to give the same response to the same (or a similar) situation. The habitual response is as easy and certain as any natural response.

Now we can talk about all sorts of habits of knowing, thinking, feeling and acting. A child learns sums and the multiplication tables. He does so by forming habits, or habitual connexions, between arithmetical figures. He forms habits of reading and writing. He forms habits of feeling afraid in the dark, or of feeling shy of strangers. or of joy at a rival's failure. He forms habits of judging others' behaviour and also his own. He forms habits of saying 'thank you', 'good morning', and 'good night'. He forms habits of behaviour during dressing, playing and eating. In short, when he grows into an orderly, methodical young man, he has formed a 'bundle of habits' for his different situations in school, play and social relations.

### 3. *Learning is habit formation*

Learning can be easily described as a process of habit formation. Some people can form certain kinds of habits more easily than other kinds. One child can easily form habits of mathematical relations, and another the habits of playing football or badminton. Some kinds of habits are formed at once, after only one experience, others may take a long time and many repetitions. A child if it gets burnt after touching a hot object (the chimney of a lighted lamp) will never touch a similar object again. Here, a single experience has been sufficient to develop a habit of avoiding. The strength of the *emotion* in this case is as useful as many repetitions. But it requires a much longer number of experiences for a child to learn a simple mathematical relation such as  $4 \times 3 = 12$ .

What we usually understand by learning is a more or less permanent modification of cognition and behaviour. If a child is once able to count up to twenty without any mistake, then we do not consider him as 'having learnt enough to count up to twenty'. We only give him credit for his learning when we find that he can usually perform the counting without any mistake. In other words, we acknowledge a case of learning only when we are sure that there is the formation of a habit. The learning may be of a complex task like the habits of cycling, or knitting patterns, or it may be as simple as the holding of a pen or a piece of paper. When directing the learning of a child or young person, we should encourage him to form good, useful habits, and learn to give up bad or harmful habits.

### 4. *Bad habits*

Sometimes the habits that are formed are useless, at other times they may be definitely undesirable. Such habits are often described as *bad*. One may have a bad habit of making mistakes in spelling, e.g. writing 'defini-

tion' as 'defination', or 'method' as 'meathod'. One may have bad habits like biting one's nails. Negligence of important tasks, extravagance, or indulgence in gambling are more complex types of bad habits. It is necessary to try to remove them, and the rules of learning may be applied for this purpose. So far, we know that learning is a process of habit formation. Hence, we may say that the removal of a bad habit necessarily requires the *formation of a new habit*. It may be helped by a process of breaking the old bad habit.

The *breaking of a habit* can be brought about *first* by *non-practice* of the habit. You refuse to bite your nails, to mis-spell 'definition' or smoke a cigarette. This advice is however easier said than done. It is a good thing to make the decision to reform as binding as possible. A promise can be made in public, or a vow can be made in a temple or a place of pilgrimage, not to perform the bad habit. *Secondly*, we should *make the old habit unsatisfactory*. Every time we perform the habitual task we should be conscious of dissatisfaction. So instead of being unconscious about the habitual act, we should perform it deliberately and feel disgusted at it. Let us deliberately mis-spell definition fifteen or twenty times, feeling disgust every time. Soon we will find that the bad habit has disappeared. This method however will not prove useful when we have to deal with a strong physiological, organic craving, e.g. the habit of drinking, taking drugs, or smoking. *Thirdly*, let us try to gain *a high degree of perfection in the new habit*. Let us be enthusiastic about the new habit. If you have a chronic habit of laziness, then you should not be satisfied with merely snatching ten minutes of work from the afternoon of sloth. Let us muster enthusiasm to wish to work throughout the whole period now wasted in idleness. Negatively, this also makes the point that we should never relapse, nor relax into the old bad habit. If you give up smoking for ten days, and



then accept a cigarette, the odds are that you will soon fall back into the old habit. *Fourthly*, we should try to reform the bad habit. That is to say, use its energy for ends which are useful and desirable. This method is best suited for the complex social habits. A quarrelsome or argumentative person may make an excellent political leader. An imaginative person may make a successful story writer or designer. A boastful person may transform his selfish boasting as an individual into propaganda channels boosting the excellence of his community, school, country or cause. Such a change may induce him to undertake research into the historical development, and comparative study suited to the needs of his topics. This reform of the individual's boasting would be eminently a socialization of his bad habit. Such a reform or socialization of selfish individual bad habits is known as *sublimation*. This is the best method for reforming bad habits. The method or methods to be adopted in any particular case will depend upon the given behaviour and the mental make-up of the individual. The past development of the habit, the character of the emotional satisfaction and the vagaries of the adverse valuation of the bad habit by society, will finally determine the treatment necessary for its reformation.

### 5. *The process of learning*<sup>1</sup>

The learning of any complex task like cycling may be described as follows. At first the learner makes some right, and some wrong movements. Later, he eliminates the wrong movements, and makes the right movements in their proper order. He also takes much less time to perform the total task.

It is evident that the right movements lead to success, and so to pleasure. Also, the wrong movements lead to

<sup>1</sup> Read the process of 'receiving the impression' (p. 125), as that is the first step in the process of learning.

failure, and thus to pain. So it is readily admitted that success and failure play an important part in fixing the right movements and eliminating the wrong ones. How they do so is a matter which is still disputed by different theorists.

The *reduction in time* is partly due to the absence of wrong responses, and partly due to practice. Practice not merely strengthens the series of connexions, but it also leads to the development of *better methods of response*. Suppose there is a beginner in typewriting, who is typing 'and'. At first he will spend some time in finding the key for 'a', then press the key, and then see that the impression 'a' is typed on the paper. Supposing he takes one second for each task, he will then take three seconds for 'a', three for 'n', and three for 'd': a total of nine seconds (see 1). This will always be the case when he types *letter by letter*. But supposing he develops a new method of typing *whole words*. Then there would occur a slight overlapping of responses. While he is pressing the key for 'a', he will also be finding the key for 'n'. And while he will be making sure about the impression of 'a' he will be pressing 'n', and finding the key for 'd'; now he takes only five seconds (see 2). We can compare the time taken for the two operations by using a dash to represent the times for pressing and verifying.

(1)	a - -
	n - -
	d - -
	<hr/>
	1 2 3 4 5 6 7 8 9

(2)	a - -
	n - -
	d - -
	<hr/>
	1 2 3 4 5

We find that by the second method there is a saving of about 45 per cent. In the same way, further practice may lead to the development of the methods of typing phrases, and thus increase the speed of the typist. Since words and phrases are larger units than letters, so this type of deve-

lopment is known as *the formation of higher units of response*.

In the case of reading, the child at first learns to read letters. Later he is able to combine two or three letters into words. But his reading proceeds from one word to another. After some time, the child is able to read two or three words in a single unit of activity. In the later stages, the child learns to read sentences filling several lines. His development from one stage to the next, occurs as a result of the formation of higher units of response. In the same way, the understanding of the words that are read, the processes of knowing, follow a parallel series of stages.

#### 6. The curve of learning

If we take a graph paper and draw a line OX, and another line perpendicular to it OY; and if we have the measurements of the progress of a student at fairly regular intervals, then we can plot a *curve of learning* (Fig. 17).

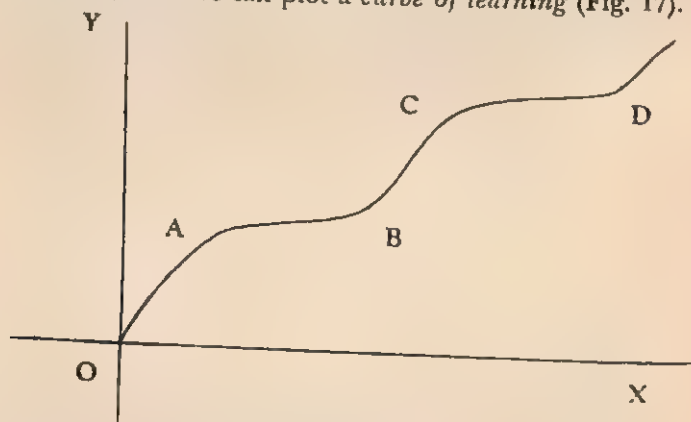


FIG. 17. The curve of learning.

Every curve of learning shows at first a steep rise (O to A) describing a period of rapid improvement from zero. This period of rapid progress is followed by a period

of little or no progress (AB). Further practice shows another period of rapid improvement (BC), which again leads to a period of little or no progress (CD). The period from A to B, or C to D, makes a flat stretch in the body of the curve of learning; so it is usually described as a *plateau*. The student rises above a plateau only when he adopts a better method of response to deal with the task situation. Many people lose heart when they find that practice does not immediately lead to improved efficiency, say in typewriting, or telegraphy. They should remember that when practice with a certain method does not lead to any improvement, what is required is a still larger unit of response for performing the task. But the formation of each superior unit of response means a breaking up or an essential modification of the earlier simpler habit. This breaking up of the old and familiar behaviour into simpler parts, and recombining into fresh habits is a period of considerable conflicting activity. Such conflicts and changes are both among conscious processes, and the relatively unconscious bodily or synaptic connexions. These reforming processes take their own time, and during that period there is little or no progress. Perhaps this knowledge will enable them to carry on with confidence.

### 7. *Fatigue*

When any muscle or group of muscles is used for a long time, it gives us the sensation of fatigue (see p. 53). In the case of a small group of muscles, say the middle finger of the right hand, if the flexion of the finger is used to lift a kilogram or so of weight every two seconds, then after some time the finger gets tired, and the weight is not lifted the full distance. If we continue trying further, then soon the finger is too tired to move even a little bit. After a short rest the muscular fatigue gradually disappears, and the muscles regain their

normal strength and efficiency. From the point of view of the body (physiology), the fatigue is due to the accumulation of waste-products (lactic acid, etc.) in the various muscles and nerve connexions, and is accompanied by increased synaptic resistance. This experience of 'local' fatigue is limited to a given group of muscles and the performance of a given task. And even a slight shift in either of them, shows an improved efficiency of performance. If we have been sitting long in a given posture on a chair, then we feel fatigued and uneasy. But a slight shift in the posture from time to time relieves us a great deal. 'General' fatigue is a rare experience, and implies fatigue of all skeletal muscles. (The non-skeletal muscles or the viscera connected with circulation, respiration, etc. and the vegetative functions, is immune from fatigue.) Further, bodily fatigue is usually a relative affair. When tired, if we meet with an emergency, we do respond with considerable energy and alacrity. In the laboratory too, the giving of suitable incentives (like 'try for the sake of your honour' or 'country') usually results in a fresh spurt of work. 'Absolute' fatigue is very rare and often indicates serious injury to the muscles concerned.

Mental work is also, at the same time, some sort of bodily work. So mental efficiency often suffers with the onset of bodily fatigue. When we have been reading for a long time, the muscles of our eyes, eyelids, neck and back get tired in due course. We say, 'I was reading for four hours and now feel dog-tired'. At such a stage, we often lose interest in the said book, also the desire to read diminishes and may give place to a desire for postponement of the task of reading. In such cases people talk of *mental fatigue*. It appears that the mind also gets 'reduced in efficiency' as it loses 'interest' in the book, and the strength of its desire to continue in its task. Experiments go to prove that the total amount of

mental work is seldom reduced through any prolonged performance. Tsuru Arai tried mental multiplication of 3-figure numbers for some 18 hours each day, for four days. The work done during the first half-hour was equalled or sometimes even excelled during the last half-hour. Mental fatigue is however inferred from a relatively greater number of errors committed in the performance of the later work periods. It is explained on the basis of an increasingly irregular frequency of the oscillations of attention.

### QUESTIONS AND EXPERIMENTS

1. What is the definition of learning?
2. What is a habit?
3. Describe how learning is habit formation.
4. What will you do to remove a bad habit?
5. Describe four cases of your habits. Point out in what way they are mental. Try to describe their development.
6. What is the process of learning?
7. Ask a student to read aloud a passage from a book as far as he can. When he has read two lines, and is starting the third line, cover the book. Note the word he was speaking when you covered the book. You will find that he is able to speak three or four more words. So you can deduce that while speaking one word, he was ready to speak the following word, was getting ready to speak the next, had seen the third word, and was seeing the fourth word. Practice in reading indicates the development of higher units of response.
- Do you find any higher units of response in playing football or tennis; hockey or badminton; bridge or chess?
8. What is the curve of learning? What are its characteristics?
9. What is a plateau of learning? Why does a learner remain in it? How does he get out of it?
10. What is the use of practice in learning?
11. Select eight stanzas of some unfamiliar poem, learn the first four by the 'whole' method, reading the whole task four times. After half an hour write down the said stanzas, and note the number of errors. Next day, learn the next four stanzas, reading once every 15 minutes. Half an hour after the fourth reading, write down these four stanzas and note the number of errors. Find which method is better for learning (see p. 125).



## Chapter XII

### ACTION

#### 1. Definition

Every living animal makes a number of movements. Of some movements or processes it is not at all conscious, e.g. we blink our eyes five or six times every minute ; the pupils of our eyes contract when a strong flash of light falls upon them, and they expand when we go into a dark room or the light grows dim. The movements of the heart or the lungs are also mostly quite unnoticed. But there are many movements which are results of conscious wishes ; e.g., picking up a particular book ; speaking any sentence ; running to meet or catch another person. Here, the conscious processes occur before the movement ; or they are antecedent to the movement. But we are not conscious of each moment during the movement, as most of the bodily processes concerned in the picking up of the book, speaking the sentence, and running go on habitually. It appears as if our wishes have been transformed into movements, which can be related with our wishes, but during whose performance we have no conscious experiences. There are also movements which are accompanied by conscious processes ; e.g., laying toothpaste on a brush, free-hand drawing, behaviour during our first experience of a big party with strangers, the first visit to the principal's office, the conscious touching and picking up of a hot object with bare hands. In these cases, although the movements are begun by the activity of certain wishes, their execution is also accompanied by conscious experiences, which may control and guide our movements. Conscious processes which are experienced while the movement is going on may be described as concomitant consciousness.

*All movements which are the results of conscious wishes, or which are accompanied by consciousness, are*

called *actions*. In other words, a movement without any antecedent or concomitant consciousness is simply a movement, but movement with, or following, consciousness is an *action*. The psychology of 'action' is the description of the conscious processes that lead to different kinds of actions; and the changes in the conscious processes that are the result of practice.

Actions may be simple, or complex. In the case of *simple actions*, the movement is simple and the conscious contents are also very simple; e.g., picking up your pencil; flicking away a speck of dust. However, in *complex actions*, the movement is simple enough, but the conscious contents are complex, e.g. selecting a pencil out of a large group of different sizes, colours and shapes. The movement of picking up the selected pencil is quite simple, but the conscious processes during selection are much more complex. The giving of a coin to a beggar is not very complicated; but, many aspects in the social situations may have to be considered before the decision to give is arrived at. Is the beggar worthy of charity? Does my purse permit this demand? Is my action likely to be approved by society? What will my companions think? Unless the conscious experiences or impulses leading to an action are complex, we would not describe the action as complex. Thus a complex series of finger-movements by an expert piano player may not be complex actions when they are not directly connected with complex conscious processes.

## 2. *The reflex movements*

From the point of view of psychology, a reflex movement is the simplest process. In fact it is a purely bodily process. It is only a few reflexes that can be connected with conscious processes. Blinking can be consciously produced, or obstructed to some extent. But in the majority of cases the reflex movement is essentially the

result of a direct nervous connexion between a sense-organ and certain sets of muscles. Consciousness can at best obstruct it, but is powerless to help it. Our conscious winking is not nearly so quick as the blinking reflex. However simple the reflexes may be, they have been considered by some psychologists as the elementary processes whose combination leads to the formation of all complex behaviours. Speech begins as a reflex crying. Later, experience moulds it into wonderful complexity. All this dance of life, and the complexities of civilized behaviour are in the same way developments of the simple reflexes of the child. Therefore it is interesting to notice certain of these reflexes.

The *typical reflex* movement is a simple movement. It depends upon a direct nervous connexion between the sense-organ *receptors* and the motor-organ *effectors*. It goes on unconsciously. There is neither concomitant, nor antecedent consciousness. We neither guide nor start the reflex. It is a pure mechanical, bodily movement; it is not a mental action at all. It is started by a simple stimulus, e.g. a slight pressure on the eyelids, a sharp blow on the knee, a change in light-intensity for the iris. It always occurs on the presentation of the natural stimulus, unless there is an obstruction. It is found among all members of the species. The secretion of certain glands also goes on as a reflex process. So sometimes we read about the salivary reflex, and the tear-gland reflex.

### 3. Simple actions

The conscious processes that precede action are usually described as *motives* or impulses. The term seems to imply that conscious processes lead to action. So we think it necessary to expose this false implication. We must warn the reader that there is no reason for assuming any impelling force in conscious processes. The nature of the interacting processes between the mind and the

body is not yet known to us (see p. 16). So we shall only discuss the conscious processes experienced before or during action. And our readers should not hope to learn (from this book) how our will is transformed into action.

When we pick up a pen with full knowledge of what we are doing, our mental experience may be described as the conscious impulse for picking up the pen. This experience can be easily analysed into a number of distinctive processes :

(i) There is the *perception* of the pen or the object. It is evident, we cannot act upon any *image* of the object. The perception may be quite clear and full of detail, or it may be only vague.

(ii) Before the picking up takes place, the knowledge of the necessary movements or a *plan* is present as ideas. These ideas again may be full of detail, or may be vague, e.g. I will move my right hand in a certain direction ; or I will move my left arm to pick up a box, use the right hand for opening it, and then take out the pen with my right hand.

(iii) Before the movements take place, the change that we wish to produce by our movement or a *purpose* is also present in the form of an idea ; e.g., I will write with the pen ; or I will give the pen to Mr A ; or I will put the pen in my pocket. The end as present in the idea may be a vague, condensed sort of experience ; or it may be definite. Mostly the immediate end of a movement is intimately connected with other remote ends. I put the pen in my pocket, as I am going to a meeting and shall take notes, which I may keep as a record, or publish for general information, or discussion, etc. later on.

(iv) Lastly, before the movement takes place, there is an *affection* mixed up with the above-mentioned perceptions and the ideas. The affection may be present in a very mild and negligible degree, or it may thoroughly colour the total experience or wish-psychosis, e.g., I will write the

name of my child on her primer; I will put my signature on the college Roll of Honour; or I will sign an international treaty of friendship and peace.

These processes that make up the impulse or motive of a simple action can be summarized as: a perception of the object; an idea of *own* movement; an idea of the result or end; and affection. During these conscious processes, the state of attention is passive.

In the case of simple action all the four part-processes are simple, and together they make up the conscious motive to the action. It will be easily noticed that the various processes are necessary for successful action. The perception of the object must be not merely visual, but may also be auditory, or tactual, etc. for the performance of the act. An idea of the end is necessary to make our action precise. If we go to a particular shop to buy a definite object, our actions are definite and precise. But when we have no definite end, and are with a group of leisurely tourists, our actions will be indefinite, and the directions pursued will be as accidental as our vague end of sight-seeing. An idea of our own movement is always useful to make our action efficient for the success of our end. The more clear these ideas and perception, the more successful will be our action. Hence from the point of view of psychology (i.e. mental processes), the highest impulsive action, or the most completely conscious action, will have detailed perception of the object, elaborate ideas of *own* movement and detailed knowledge of the result.

An impulse or a motive may be divided into two parts, the cognitive, and the affective. The perception of the object, and the ideas of own movement and the end, form the cognitive part. This is called the *inducement* to the action. The affection forms the affective part, and is called the *incentive* to the action. The two processes of inducement and incentive make up the *motive*. A child sees a

banana and picks it up. The sight of the banana is the inducement, and the pleasant feeling in the anticipation of eating is the incentive to the movements of picking up the banana. Some modern psychologists do not make this distinction between the inducement and the incentive. They seem to consider the motive as an indivisible whole : so they treat all the three terms as equal in content and scope.

#### 4. Complex action

When the action takes place following a competition (or conflict) among different impulses (or impulses and opposing ideas), then the action is called a *complex action*. When the action is the result of a rivalry between two impulses, then it is called *selective action*.

##### (i) Selective action

We often find that out of a number of competing impulses only two are very strong. The others can be easily rejected. But when the two are almost equally strong then the selection is fairly complex. The mental experience in this case, however, is easy to understand. Instead of one completely conscious impulse, we have two impulses present at the same time, in a state of active attention. The perception of the two objects, and the ideas of the results are often clearly present together, but the ideas of 'own movements' are usually not so clear. The affection is also indifferent or unpleasant, but it changes after selection.

When we go to a shop to buy cloth, we are shown a large variety of material. If we are not rich enough to buy more than one piece, then the selection becomes quite a problem. Usually we can easily reject a large number of them after a single observation, for they do not suit our taste, or purpose, or pocket. Then there are left about three or four kinds of different designs or quality. Ultimately we narrow our choice to two very useful and attractive



pieces. Now our mental experience is made up of the following processes : (a) Perception of *one* object, ideas of the result of its purchase, and the idea of our own movements for the purchase and carrying of that piece ; (b) the perception of the *second* object, and the ideas of result and our own movement referring to that ; (c) an indifferent affection tending towards unpleasantness. (If there is strong affection for one of the two objects, then the other is immediately ruled out. Hence, the situation of selection implies the absence of strong affection.) (d) The ideas associated with the perceptions, and the ideas of the results. All these processes occur in a state of active attention.

We must remember that all these processes are not quietly going on side by side ; but that there is a keen struggle culminating in action. It is a delicate but dynamic situation. In some cases we can almost visualize how one or the other alternative gains in strength. A man is cycling on a road, and he sees another cyclist coming from the opposite side. There are two alternatives (i) swerving to the right, or (ii) swerving to the left. If the cyclist is a novice very likely he steers for one moment to the left, and then changes again to the right, and his alternate (impulsive) movements lead to a collision. A similar situation also occurs sometimes even when walking.

Further, the different perceptions, ideas and associate ideas are often crowded together in a very short time. So it is not usual to find the various processes as easily distinguishable as they appear from this analysis. Supposing you are sitting in formal company, and someone offers you a plate of sweets. Being polite you have to accept only one piece, but being human you desire to select the best piece. However, there is not much time to pick and choose. Your attempted selection should not be expressed by even a moment's hesitation over the plate. So the various processes of perception and ideas occur in a flash.

Similarly in a game of tennis, when you choose to strike to the right or left, to lob, volley or cut, the selection occurs in a very small fraction of a second.

(ii) Volitional or voluntary action

When we have a complete impulse to do something and an idea about not doing the same thing, then there occurs a conflict in the mind. The conscious experience thus becomes complicated, and the resulting action is called *volitional* or *voluntary* action. Supposing a friend asks me to go to a cinema, but my examination is near and I have an idea not to go to the cinema. The impulse to go to the cinema is aroused by the friend's request ; but the anxiety about the examination opposes that impulse. The anxiety does not arouse an impulse ' not to go ' as all impulses are positive and move us forward. So my anxiety appears in the given psychosis as an idea or a set of values, or an agreement against going to the cinema. I may say, the picture is not good ; or I must finish this book or chapter ; or I have no time to spare from my studies for the examination. Then after some argument, I may *decide* to go, or not to go. The action or inaction which is the result of such a decision is called *volitional* : I decide to go ; or I decide not to go.

Sometimes a selective action is mistaken for a volitional action. For psychological distinction we describe the action following a struggle between two impulses as selective ; and the action that follows a conflict between a negative idea (an idea *not to do*) and an impulse *to do* as volitional.

In the case of volitional action there is only one impulse, but it cannot express itself in movement, because there is also an opposite idea. All the mental processes occur in a state of active attention. In a typical case the situation appears as a problem ; e.g. Shall I take up higher studies, or not ? Shall I marry or not ? Shall I accept a low-paid

job, or not? These are problems for decision and volitional action or inaction. But similar situations may occur as opportunities for exercising choice, e.g. Shall I take up higher studies, or accept a low-paid job? Shall I marry X or Y?

In all these cases one finds reasons *for*, as well as reasons *against* the proposed action. So we consider the pros and cons, and try to reach a decision. Sometimes we find it difficult to decide and then we may seek the advice of another individual. There are also cases where the 'decision' is made to rest upon chance, the throw of a coin. But such actions are not really voluntary on the part of the individual agent. When an Inspector of Police decides to raid a village, the actions of the individual policemen cannot be described as voluntary. They are merely doing their duty, and obeying higher orders. However, if a policeman is offered a bribe then he may have to decide to accept, or reject. If we assume his awareness of some reasons for not taking a bribe, then his acceptance or rejection of the bribe is a volitional action.

### 5. *Deliberation and choice*

In volitional action we have a perception or an image of the object, ideas of the end and of our own movement; and ideas not to do; as well as series of associated ideas both for and against doing the act. The period during which we consider the pros and cons of doing the action is called the period of *deliberation*. The processes of deliberation lead to the *decision* or *resolution*. In the case of selective action the period of conflict between the two impulses is called a period of *hesitation*. The processes of hesitation end in a choice.<sup>1</sup> The choice of one alternative implies the rejection of the other. The rejected motive loses its ability to lead to action at that moment, but it may become active on a later occasion. We reject the motive to play or go to a cinema while studying just

before an examination, but the motive of play or visiting a cinema show becomes active very soon after the examination.

#### 6. *The psychomotor actions*

When a simple impulsive action is repeated on many occasions, it becomes a practised action. The child's first attempt to write an A is an impulsive action. It perceives the pen and the paper, it knows what it wants to write, and it is keenly conscious of the ideas of its own movements; that is, first a movement downwards, then a different movement downwards, and then one from left to right. But the same child after some time gets practised in writing A. Now his conscious processes, that precede or accompany the writing of A, are a good deal different. At first it was useful to have clear ideas of our own movements and the end, before beginning to write. Now as a result of practice these ideas of our own movements are no longer very useful or necessary. So the idea of our own movement is lost from the conscious contents of action. The perception of the object also now is reduced, and the idea of the result is also no longer very clear, nor dominant. Both of them seem to be fused into a single assimilation. The 'knife' and 'cutting bread' are no longer two separate knowing processes. Now the 'knife' is known as a 'cutter of bread'. The reader of this book is so practised in writing letters that he or she does not clearly perceive the pen or paper and the idea of the movements while writing his or her own name. The idea of the end is now directly connected with the perception of the object. The pen and paper are indirectly perceived as mere conditions for the action of signing. The useless processes of the ideas of our own movements have been eliminated by a process of 'natural economy'. The affection is also lost through practice. All the processes now occur in a state of secondary passive attention. Since the

practised movement occurs along with the reduced perception, it is called *sensori-motor*, or *psychomotor*. We have seen that practised knowing becomes a 'direct apprehension' (p. 126). In the same way a practised action becomes a direct 'perception action'. It is a fusion of the psychic or mental and the bodily or motor processes. Thus it is well described as *psychomotor*.

The selective and volitional actions also become *psychomotor* through repetition or practice. Supposing a man forms the habit of preferring a mild cigarette. If in any party he is offered both cigars and cigarettes, he will at once pick up a cigarette. In such a case his action is of the *psychomotor* type. However, since the action develops out of the complex situation of selective action, it is called *secondary psychomotor*. If a student finds that the examination is not very distant, and so decides not to go to the cinema, his decision of not going on any occasion before the examination, after a few repetitions, is made in a *secondary psychomotor* manner. You propose going to a cinema, and he immediately rejects it.

### 7. *The acquired reflex or automatic movements*

If practice or repetition of any simple act is carried on for a very long period, the movement takes place without any consciousness. The movement becomes like a reflex, because it has no conscious processes either preceding, or accompanying it. These are not inborn movements like the reflexes, but they are acquired through long practice. So such a class of actions which have lost all conscious processes are best described as *acquired reflexes* (or *secondary reflexes*). A man may acquire the reflex movement of hitching his trousers up with both hands, every time he gets up from a chair, another may acquire an automatic drumming of the fingers on a table or any hard surface. A woman may automatically move her handkerchief around when she opens her bag. Many cricket and tennis

players flourish their bats or rackets in a habitual reflex behaviour. A salesman may form the habit of automatic repetition of certain phrases. The varieties of acquired reflexes are to be compared with the variety of individual characters.

When such movements are the outcome of the practice with secondary psychomotor actions, then they may be called *automatic*. A motorist is required to swerve to the right when he wants to overtake another car, and to swerve to the left when he wants to stop. A practised motorist automatically swerves to the right or the left, on the proper occasion.

Many times our bodily reflexes get modified as an accident of the individual's experiences. Food in the mouth leads to a reflex process of salivation. In the course of growth we learn the visual form of the food, and in due course learn its name or names. Now, if we see the food, say mango slices on a plate, or hear the word 'mango' there may be a reflex salivation, especially if we are hungry. Since we are not born with the reflex nervous connexion set up between the hearing of the name 'mango', or the seeing of certain coloured slices on a plate, with the excitation of the salivary glands, we may describe such 'modifications of reflexes also, as acquired reflexes. They are technically called *conditioned reflexes*, as the activity of such reflexes implies certain conditions of past experience. Since the change takes place without any conscious processes, we continue to call this a reflex. In a laboratory an electric shock is applied to a finger muscle, and an electric bell is rung at the same time. After some repetitions, only if the bell is rung, the finger muscle contracts. The latter has now developed a conditioned reflex connexion with the hearing of the bell. A strongly conditioned response to a bell can also be transferred to another signal, say a flash of light. This gives rise to the development of a second order *conditioned response*. The



behaviourists believe that the development of our appreciation and mastery over the objective world is obtained through a development of more and more complex conditioned responses or reflexes.

### 8. *The reaction experiment*

The experimental study of action-consciousness has been carried out by means of the reaction experiment. At first the experiment was designed to find out the quickness with which a man can respond to a light, or a sound. The simple reaction experiment measures by means of delicate clocks the time taken by a person to see a light and press a button. The experiment may be altered to find the reaction time to sound, or touch. This experiment is called simple, because there is only a single simple stimulus, a light, a sound or a touch. The response also is a simple movement of pressing or releasing a key. The introspection of these simple reactions helps us to learn the several mental processes that are present during the simple impulsive actions. The different stages of the development of the psychomotor and the acquired reflex movement can be easily noticed in a long series of reaction experiments.

The reaction experiment can easily be made complex by having more than one stimulus, and by combining them with more than one kind of response.<sup>1</sup> We may require a movement of a right-hand finger on the perception of a red light, and one of a left-hand finger on the perception of a green light. We can add a still larger number of stimuli and join them with a variety of responses. These experiments help us to understand the processes during situations of choice. These observations enable us to determine the time for a choice reaction. Such experiments have also been modi-

<sup>1</sup> When the subject has to make a simple response on seeing 'red', but withhold the same on seeing 'green', then the time is called 'discrimination' time.

fied to test the agility or ability of a motor-driver or an air-pilot.

### 9. *Instincts*

Some tendencies to perform certain complex actions can usually be noticed in all animals, shortly after birth. A young chicken pecks at small objects, a few minutes after being hatched. A human infant can suck milk shortly after birth. These movements are perfectly performed, even at their first occurrence. They also serve very important purposes of life. However, the purpose or end of these movements is not known to the individual agents, so they are said to be blind tendencies. The animals are not conscious of the ends of their instinctive movements. The very young monkey clings to his mother but has no consciousness of the danger of falling. Nor do we believe that he has a conscious appreciation of the fact that clinging to his mother will help him to escape the danger. These *in-born but blind tendencies for purposive movements*, or series of movements, are called *instincts*. The activities of the lower animals like ants, bees, etc. are almost entirely on the instinctive level. In the case of higher animals like cats, dogs, horses, etc. the field of instincts is relatively less wide. Among adult men we find many activities which are only remotely connected with the direct urgencies of animal instincts. The best examples of instinctive activity appear in the hive-building and general life-cycle of the bees: the spinning of the cocoon by the silk-worm, the homing of pigeons, etc.

An instinct has its cognitive, affective and conative aspects. The butterfly knows flowers, feels peculiar emotions, and makes series of movements towards them. A bird under the influence of the nest-building instinct shows an appreciation of suitable places and objects, and makes complex responses to build the nest. The strength of its emotion can be easily noticed in the persistence of

its efforts if it meets obstacles, or the nest is destroyed. Instinctive actions are usually accompanied by strong affection, or *emotion*. Certain instincts are always accompanied by distinct emotions, e.g. the fighting instinct and anger; the instinct of escape and fear. So a famous American psychologist, W. McDougall,<sup>1</sup> has prepared a list of instincts on the basis of the definiteness of the bodily behaviour of their respective emotions. The list is as follows:

<i>✓Instinct</i>	<i>Emotion</i>
1. Escape	Fear
2. Combat	Anger
3. Repulsion	Disgust
4. Parental	Tender emotion
5. Appeal	Distress
6. Mating	Lust
7. Curiosity	Wonder
8. Submission	Negative self-feeling
9. Self-assertion	Positive self-feeling
10. Gregarious	Feeling of loneliness
11. Food-seeking	Gusto
12. Acquisition	Feeling of ownership
13. Construction	Feeling of creativeness
14. Laughter	Amusement

The conscious contents of any instinctive action can be analysed into (i) the perception of the object or situation (ii) the idea of own movement or movements, and (iii) emotion. There are no ideas of end or result. This is also expressed by the phrase 'instincts are purposive but not purposeful'. They serve life purposes; but carry no consciousness of those purposes or ends.

There are some instincts which are not active at birth; but they become active when the animal has grown a

<sup>1</sup> He was born and educated in Great Britain. His later years were spent in America.

little older, e.g. flying in birds, and sex among many animals. An interesting experiment was performed in which some birds were brought up in captivity so that they could neither move their wings, nor see other birds flying. On reaching the age when birds of that species can fly, they were released. All of them flew without any difficulty. The activity of this instinct was the result of the growth of the flying apparatus in their bodies. These instincts are called *delayed instincts*.

c 10. *The modification of instincts*

As man and animals develop, they learn to modify a number of their instinctive responses. They also learn to connect the instinctive responses with different stimulus-situations. A small child shows the fighting tendency only when his movements are restrained. He becomes angry, and hits, kicks, or bites the object of his anger. As the child grows older he may learn to start a fight when someone insults him, his school, or his parents. He also learns to use certain tricks for fighting, and checks impulses to bite. But he continues to feel anger as he did in his early childhood. In short, during each activity of the fighting instinct, the experience of the emotion of anger remains unchanged. In the same way we notice that, in the course of development, other instincts can also be modified to a great extent among human beings. For example, the food-seeking instinct is modified so that we do not put everything into the mouth, but only some food articles. Again, we do not eat to satisfy our hunger only. We also pay due regard to the principles of health, cleanliness, taste-habits and social courtesy. The enjoyment of food is however believed to remain constant. Again the social tendencies for submission and self-assertion get modified in many ways. We learn to submit to higher authority, rather than to stronger physical force. We express our humility in speech and gesture,

imitation and praise, rather than in childish passive submission. We learn to assert ourselves on certain occasions : and do so in various ways. The emotions of ' positive ' or ' negative self-feeling ' , however, do not change. In short, the instincts can be modified in their cognitive and conative aspects only. The affective aspect of an instinct is the basis of education, and the limits of instinctive modification are also the limit for education. Education is mainly an improvement of the ' knowing ' and ' behaving ' of a person, so it is intimately concerned with the modification of instincts.

### QUESTIONS

1. Distinguish between a movement and an action.
2. What is a reflex movement ?
3. Describe the motive of a simple action. What is the inducement and the incentive in the case of the following actions ? (a) A beggar asking for a coin. (b) Your taking notes in the classroom. (c) The player sending a service in tennis or badminton. (d) A football player kicking towards the opponent's goal. (e) Listening to music.
4. What is a complex action ? Describe the mental processes that precede or accompany a selective action.
5. What is voluntary action ? Describe a case of voluntary action.
6. Write short notes on hesitation and deliberation.
7. Distinguish between choice and resolution.
8. What is a sensori-motor, or psychomotor action ? How do you compare and contrast it with a simple impulsive action ?
9. What is a secondary psychomotor action ?
10. What are acquired reflexes or automatic movements ? How do they differ from psychomotor action ?
11. Describe the simple reaction experiment.
12. What is an instinct ? What are the mental processes that accompany instinctive actions ?
13. Describe some instinctive actions of a dog, a horse, and a man.
14. In what respects can instincts be modified ?
15. What is a ' conditioned reflex ' ?

## Chapter XIII

### SENTIMENTS AND SELF

#### 1. *Emotion, mood and sentiment*

An emotion is a highly affective experience that sometimes accompanies the perception of a situation. If one has a tendency to experience emotions in the presence of certain persons or objects, or during the discussion of certain ideas, then one is said to have 'sentiments' for those persons, objects or ideas. The tendency may be a simple tendency and give rise to only one kind of emotion. A child may have the tendency to feel fear in darkness. He may be described as having a sentiment of fear for darkness. This simple sentiment is very similar to a mood. Both are emotional tendencies. They have a similar origin. The *sentiment*-tendency is also the effect of emotional experiences, like a mood. They give rise to similar affective experiences or emotions. Just as a mood of irritation gives rise to the emotion of anger on very trifling occasions, so a man's sentiment against the government may lead to anger at the perception of a government servant's uniform hanging in a shop, or the photograph of a 'leader in power'. But there are also important points of difference. The mood is a conscious emotional tendency; while sentiment is an unconscious emotional tendency. The mood intimately affects our conscious experiences. But we are never directly aware of our sentiments, they are unconscious affective tendencies. A mood is a conscious state of an individual; but one is not conscious of a sentiment until it gives rise to an emotion, and we infer its presence. We infer that A has a sentiment of love for B, when he feels jealous of the favours C receives from B.<sup>1</sup> The mood has no

<sup>1</sup> In the words of McDougall, we may say that a mood is a fact of mental 'function' (or activity), while a sentiment is a fact of



definite object. It fastens upon any object that is likely to serve its expression. But the sentiment is always directed to a definite end. The end may be as definite as a particular man or woman, a picture or a treasure. The idea of the end is always definite, though the end may be as vague as humanity, liberty, sportsmanship, beauty or a world religion. Further, a mood is essentially temporary; it subsides after some time. But sentiment is relatively permanent, it is always with us, whether excited or otherwise. It is a *permanent part of our mental make-up*.

Some sentiments are not simple. They can give rise to a variety of emotions. The term 'sentiment' is commonly understood in this sense of a *complex sentiment*. Sentiments are also the results of different emotional experiences. They are to be distinguished from 'the complex emotions'. We have very complex sentiments towards our parents. When we hear them praised we feel pleased, when we hear them belittled we get angry, and when we hear of a danger or loss to them we become afraid or sorry. Our experience of these different kinds of emotions can be explained as the effects of a complex emotional tendency or sentiment. Such a sentiment has a complex dynamic potentiality. However, before we experience the above emotions, and also during those experiences, we remain unconscious of the existence or activity of our sentiments.

The emotion occurs in a state of passive attention, and the situation forces itself upon the subject. But in the case of the sentiment, *the situation is actively attended to* and appreciated. News of 'loss' alone has not much value for passive attention. It has to be actively attended to, and noticed as referring to our parents, before our sentiments bring about the emotion of sorrow. The sentiment-

mental 'structure'. He also often appears to use 'sentiments' as an 'organization of instinct propensities'; and instincts are the basic elements of any person's permanent mental make-up or structure.

tendencies are excited by the appreciation of some perceptions in a state of active attention. Often this perception amounts to the experience of a more or less definite *judgement* upon the situation concerned. This implies that sentiments can be formed only in such animals or individuals who are at an advanced stage of mental development. They should be able to form ideas, or appreciate judgements.

The sentiments are often described by reference to the situation in which they lead to the experience of emotions. Thus we may have intellectual, moral, social, religious and aesthetic sentiments. Whenever the active attention to an intellectual situation reaches the judgement 'true' or 'false' and gives rise to an emotion, we may ascribe that emotion to our intellectual sentiments. In the same way the emotions that accompany moral judgements, or aesthetic judgements, or religious judgements may be ascribed to the moral, aesthetic, and religious sentiments respectively.

## *2. The formation of a complex sentiment*

A child feels a variety of emotions towards his mother on different occasions ; sometimes he feels joy, sometimes anger, and sometimes fear. So in the course of time the emotions that he experiences are no longer pure emotions of joy, sorrow, anger, or fear. They become slightly modified in the light of past experience. They become complex because of the influence of the traces of past emotions. The mother feeds, fondles and praises the child, and he feels joy. The mother is the object of joy for the child. But when she scolds or punishes, the child becomes angry. The mother that was an object of joy, now becomes an object of anger. The child's anger is essentially influenced by his past joy, so his experience is a complex emotion of anger and joy. We assume the child is old enough to connect the present anger with

the memory of past joy. For a very small child, or an animal at a lower stage of mental development, is not capable of experiencing complex emotions.

The mother sometimes finds it necessary to threaten the child. She warns him against any repetition of naughtiness, or misbehaviour, and he feels fear. Now the mother, that has been the object of joy and anger, becomes also an object of fear. It will be noticed that this experience is still more complex because of the influence of the past anger and joy. The relation between the child and the mother often leads to various emotional situations, so the child forms a habit of highly complex emotional response to his mother, or his idea of her. When the child is able to form a free idea or concept of the mother, the memories of the past experiences of emotions towards the mother would get associated with the said idea. If in any situation there is the appreciation of some intimate reference to the mother, the judgement about the mother would excite the affective mass associated with the idea of the mother.

Further just as a number of perceptions form a cognitive disposition or a habit of knowing, and get transformed into ideas, in the same way the affective aspect of experiences about one object do form an affective disposition, or tendency, or a habit of emotional response. When the appreciation of any situation touches off these affective tendencies, we experience appropriate emotions. In simpler words, *a habit of complex emotional response towards any object or idea* is called a (complex) *sentiment*. It is also described as 'the clustering of a number of different emotions round a central core which may be a person, a thing, or an idea'. We can take as illustrations love for a person, patriotism for one's country, and political sentiments. Further, because a sentiment grows out of the experiencing of different emotions, so an emotion has been called 'an episode in the life-history of a sentiment'.

The development of sentiments is supposed to follow the development of the mind in the individual. At first, we have *concrete particular* sentiments : say, the affective tendency for a particular friend. At a later stage we have *concrete general* sentiments. The affective tendency is directed towards certain types of men, the large number of our individual friends. Now we have the 'sentiment for a friend'. At the highest stage we have *abstract sentiments*. Now we have a sentiment for 'friendship'. In many cases the development does not go beyond the first or the second stage.

### 3. *The synthesizing function of a sentiment*

This view of the synthesizing function of the sentiment is along the lines of McDougall. He thinks that the experiences of emotion are connected with some animal tendency or instinct. So when we form a sentiment about our parents, our college, or our country, then our sentiment is the outcome of a *blending (or organization) of the different instinctive tendencies*. In other words the sentiment plays a synthesizing role. A sentiment, however, may be so complex as to include a number of simpler sentiments. My sentiments for my college include the different sentiments for its individual persons, objects, or principles. The sentiment for the college synthesizes a hundred different sentiments. In the same way, the sentiment for one's family is the synthesis of the various sentiments for the different members of the family. We may like some persons, admire certain of their ideas, and disagree with others. Again, we may have a mixed pattern of sentiments in one individual so that one of them dominates the rest. In such cases we have the example of a *ruling passion*. One man develops a very strong sentiment of love for a woman ; another for a scientific theory ; a third for a social purpose. When these sentiments begin to dominate all other sentiments of the individual, they alone deter-

mine almost the entire activity of the person. Such persons seem to be always driven by their ruling passions, like slaves or machines in the service of their masters. Indeed, their knowing of the world is coloured by their ruling passions ; all their instincts, energies, desires and decisions are directed by the ruling purposes of their passions. We may say that the organization of sentiments in their structure or make-up of the mind is such that a single strong sentiment subordinates, and rules over, all the other minor sentiments. It seems as if the man's character or personality is determined by the given dominant sentiment. Theoretically however all these major and minor sentiments are contained within the comprehensiveness of the complex sentiment for our own self. This will naturally be the result of a synthesis of all different sentiments. Each of those sentiments is centred in us ; they are our sentiments. So all of them find their synthesis in a *master sentiment*, the sentiment for the *self*.

We may point out that the synthesis effected within the 'sentiment for the self' is sometimes not very successful. Occasionally there are a few sentiments which cannot be easily brought in touch with the self-sentiment, and they very often lead to our conduct which we fail to acknowledge or approve in normal moments. In general, however, the development of the self-sentiment leads to the sense of a permanent centre of reference for the continuous stream of our mental experience. This sense of *identity in continuity* is expressed as the ego, or 'I', which remains the same in the course of our varying 'me's'. The consciousness of the self during any moment is an experience of the 'me' only.

#### 4. *The consciousness of the self*

The self, for psychology, is the consciousness about ourselves. It does not discuss the qualities or the nature of the permanent unchanging ego. That is eminently the

field for philosophical speculation. The mental conditions of the permanent philosophical self may be fairly described as the organization of mental experiences and dispositions that are usually incorporated within, and remain subordinated to the self-sentiment. The psychological aspect or consciousness of the self during any moment may be described according to the different stages of mental development.

At the earliest stage we have the *perception of the self*. This is made up of the *visual* perception of the outward and visible parts of our body and its clothes, the *temperature, pressure and strain* sensations from different parts of the skin, and a *vague mass of organic sensations*<sup>1</sup> connected with the functions of respiration, circulation, digestion, excretion, etc. together with some degree of affection. This is the stage of pure perception which is perhaps present in the infant. A little later, the visual, tactual and organic sensations are found mixed up with images or ideas, and affection. All these make up the consciousness of the *perceived self*. Corresponding to the perceived self we may have the *idea* of the self. The contents of the perceived self at different moments may be revived together and mix in a *class-idea* of the self. The class-idea or concept of the self may express: (i) the individual in a variety of social situations, e.g. the individual at home, school, or in the playground. Here the social background is mobile and not very clear; (ii) the individual in different behaviours in the same social situation, e.g. the individual laughing, weeping, playing, singing, eating, or drinking. Here the images of the individual are mobile and vague, while the social situation is relatively clear (cf. p. 99). The psychological experience is organized around the available sentiment of the self, at the given stage of the individual's development. It also carries within it a more or less vague pattern of

<sup>1</sup> This is technically called CONAESTHESIA.



purposes, ideals and endeavours. These affective and conative aspects of our hopes and fears indeed create the more or less conscious hue and flavour of this consciousness of our self.

At the highest stage, we have the symbolic perception of the self. The letter 'I', or the word 'ego', is used as a symbol for each and all perceptions of the self, but it is commonly understood to represent the most common features of the different perceptions of the self. And it is this ego about which we often find elaborate disputes and discussions in philosophical literature.

The phrase 'consciousness of the self' is sometimes written as self-consciousness. In psychology the term *self-consciousness* does not mean a state of pride, vanity, or nervousness. It only means 'the consciousness whose object is the self'; and it may be a perception or idea, indifferent or coloured with strong emotion. It probably arises from the infant's awareness of the difference between his body and other things. Its chief elements are the pleasures and pains connected with the body. They have a peculiar degree of intimacy and warmth with the subject, which is not found in the child's experience with the outside world, or the world of objects around him. Another character that distinguishes the child's knowledge of his own body from that of other objects is due to the fact that the movements of his own body are to a large extent under his own control; whereas there is no such control over the movements of other bodies. He can move his own arms and legs, neck and trunk to suit his own wishes or fancies (within certain limits). But the movements of crows and sparrows, or dogs and cats, etc. are obviously out of his own control. Further, as a result, he can obtain and repeat the experiences of certain bodily sensations as often as he pleases. He can enjoy clapping, or *sucking* the thumb in an independent manner; which is readily contrasted with the dependence of his sensory

experiences of sight or sound or touch from other objects like a chain, rattle, spoon or toy. Moreover, the experiences of contact with one's own body are richer than the experiences of contact with other objects. When the child touches his own cheek, leg, or arm, with his hand he gets sensations from the hand as well as from the cheek, leg, or arm. But when he touches somebody else's cheek or leg, or a chair or a rattle, he is getting the sensations from his hand only.

Soon the mark of the 'self' extends to his clothes, toys, family and friends. If a child does not like you, he cannot tolerate your playing with his toy without protesting. If you praise or blame his clothes he takes it as a personal triumph or insult, and struts like a peacock or weeps and becomes quarrelsome. Of course such an expansion of 'self-consciousness' feeds upon, and nourishes, several subordinate sentiments.

### QUESTIONS

1. What is the relation between an emotion and a mood? And between an emotion and a sentiment?
2. How is a sentiment formed? Describe the formation of a sentiment of patriotism, love, fear of death, beauty, religion, culture or civilization.
3. What is the synthesizing function of a sentiment?
4. Why is the sentiment for the self described as a master sentiment?
5. What is meant by the consciousness of the self?
6. What are the different stages of self-consciousness?
7. What is a 'ruling passion'? How does it differ from the 'master sentiment'?

## Chapter XIV

### INTELLIGENCE TESTING

#### I. General

It is very difficult to define 'intelligence'. But it is easier to describe an action as *intelligent* or otherwise. Supposing you ask a man to open a lock, and give him a large bunch of keys of different shapes and sizes. If the person selects only keys of about the same size as the key-hole, then you would describe his behaviour as more or less 'intelligent'; but if he goes on trying all sorts of sizes and shapes, many of which do not obviously fit the keyhole, then you would describe his attempts as 'unintelligent'. So the term 'intelligent' simply indicates a *way of attempting and performing a task*. When we say a person is intelligent we mean that the ways in which he attempts or performs his tasks show the quality of intelligence. Usually intelligent activity is successful and useful. But we can also be sure of the presence of intelligence (or intellect) if the individual gives up, or modifies his method of attack upon a problem when that leads to failure. Intelligence expresses itself in the simplest manner in this *appreciation of success and failure*. Success usually requires a persistence of effort. But it must be persistency *with* a variation of the unsuccessful method of performance. A bowler requires persistency to be successful. But he will be an intelligent bowler only if he changes the speed, pitch, break or spin to suit the weaknesses of the batsmen. Persistency in an unsuccessful method is not uncommon. Many beasts are caught by a simple trick. Food is put in a vessel with a narrow hole in the top. The hole is wide enough to permit the animal to push in his empty jaws and head, but it is so narrow that it does not allow the animal to pull out his head with the jaws open (i.e. holding the food). Some animals are so

stupid that for hours they go on persisting in their attempt to get the food out, and they are easily caught by hunters.

## 2. *The measurement of intelligence*

We have noticed that an intelligent activity is either successful, or more efficient than an unintelligent one. We all think that a more intelligent person will do better than a less intelligent one. The task may be the driving of a car, the laying out of a garden, the cooking of food, or tailoring of a printed design. We are delighted to meet an intelligent salesman, and demand that our lawyer or business agent should be very intelligent. We are usually proud of our very intelligent friends. It seems that intelligence is useful in many respects. So men want to estimate the intelligence of others: and they often show off their own cleverness before less intelligent (less clever) companions. From the most ancient times, men have been asking riddles to estimate the intelligence of others. Mechanical puzzles and tricks were not unknown in ancient times. Even nowadays little children love asking riddles. Young men and women are immensely interested in crossword and other competitions. But none of these methods are systematic or scientific.

About 1900, there lived a famous psychologist—A. Binet of Paris. He was requested to find out the causes for backwardness among certain students of the municipal schools. He devised a number of simple general questions, and put them to hundreds of students of different ages. Later, he gave the same questions to a large number of non-school-going children, and men and women. On the basis of his experience, he was able to select a number of questions that would suit a particular age-group. Hence it was possible to draw up a standardized set of questions for ages from 3-14 years. From the answers to the questions it was possible to judge the *mental age*, to compare

that with the *actual age* of the person being tested, and thus to find out whether a man was backward, or normal. Binet was greatly helped by T. Simon ; so their sets of questions became known as the Binet-Simon Intelligence Tests. These tests were given orally to one person at a time, by a trained person. The training was necessary for giving the various types of test-items, and for giving proper credit to, or scoring the performance of, the given individuals. Similar tests for individuals were prepared by other psychologists in England, America, and Germany. By now we have similar tests in almost every country of the world including Japan and China ; and in almost every language including Hindustani, Punjabi, and other Indian languages.

Soon it was realized that the oral individual tests had some defects in public use. For one thing, they took too much time—about half-an-hour for each individual. A class of forty students would require about twenty hours' attention from a trained intelligence tester, so the testing of large groups was difficult and tedious. Secondly, people who did not know the language could not show their best in these tests. The intelligence of a man with only a slight knowledge of French would not be accurately estimated by the Binet-Simon test. The first defect was removed by the preparation of group tests, which were meant for testing a large group (of 10 to 50) in about half-an-hour's time. These also were so simplified that they could be administered and scored without the services of a trained tester. These group-tests of intelligence are often described as tests of 'mental ability', since the term 'intelligence' cannot be given a definite meaning. The 'language' defect was remedied by the preparation of *performance* tests. These tests provided standard situations which were to be solved by the movements of one's hands, or pencils. The number of errors, and the amount of time required by an individual, were taken as the

basis of his mental ability or intelligence. These performance tests are of many kinds. Some are definitely meant for use with individuals but others can be used as group-tests. Sometimes the question is very general, e.g. the drawing of a man. At other times, the questions are very definite, e.g. the pointing out of missing features in a given picture. But we can classify the 'tests of mental ability' into the following four main classes: (i) tests requiring the use of language, and meant for individuals only, (ii) tests involving language, but used for the testing of large groups at the same time, (iii) performance tests for individuals only; and (iv) performance tests for groups. Under each of the above heads we have a large variety of tests. Most of the tests contain various kinds of questions, or sets of questions, e.g. questions about 'following instructions', 'classification', 'analogies', 'number series', 'reasoning', or 'the selection of best answers'. These tests aim at testing the ability of an individual in many different fields. But there are others which contain only one kind of question: e.g. 'filling the blanks', 'classification', 'form-boards', etc.

A large amount of statistical work is carried out for the evaluation of intelligence tests and the test scores. Most of the famous tests have been proved to possess a high degree of reliability and validity. The correspondence or *correlation* of efficiency in these tests with efficiency in school or university examinations has also been calculated. The figures are fairly high for school ages, i.e. from 5-14 years. But the figures for college students are not so reliable.

A fraction called the *intelligence quotient* is often used to describe the ability of the tested person. This I.Q. is obtained by dividing the measured mental age by the actual age in years, and multiplying the result by 100. Thus a person of normal intelligence is described as having an I.Q.=100. A more intelligent person has a higher I.Q.=120 or more. A less intelligent person has a



lower I.Q.=90 or less. Some of the investigators have tried to classify men on the basis of their I.Q. values, as in the following table :

I.Q.	Grade
180 or more	Genius
160 — 179	Near genius
140 — 159	Very superior
120 — 139	Superior
100 — 119	Normal
90 or less	Border-line or moron
60 — 79	Imbecile
30 — 59	High-grade idiot
29 or less	Idiot

Nowadays there is a tendency to reduce extreme gradings. Only a very small number are expected to fall in these extreme categories, in a normal population. The terms, genius, moron, etc. are also suspected of being more literary and imaginative, rather than scientific and descriptive so it is considered more practical to have only five categories : very superior, superior, *average*. Below average, poor or inferior.

### 3. *Some results of intelligence testing*

One of the most important results is that these tests are more useful in detecting mental defect than in discovering likely genius, for the actual development of genius requires other factors besides mere high-grade intelligence. Secondly, intelligence is distributed among human beings in a *normal* manner. The 'genius' and the 'idiot' are not two separate species of human beings. One of them does not carry the mark of an angel, nor the other of the devil. There is only a difference of degree, and none of kind, between them. Lastly, the success of attempts at intelligence testing has led to the testing of various other mental activities, e.g. moral characters such as honesty ;

and personality characters like cheerfulness, leadership, humility and so on. But the most important result is found in the field of *vocational guidance*. By giving a few tests to an individual, we can suggest the best vocation or profession for him. Dr C. S. Myers has found that the following of vocational advice leads to the greater efficiency and happiness of workers in about 80% cases. An increase in efficiency of course results in an increase of wages. He has also found that the large majority of persons who do not follow vocational advice are either discontented, or do not attain the highest efficiency. These findings have been established by many workers in different fields of business and industry.

#### 4. Conclusion

An analysis of the tasks or situations used in general intelligence testing points to the following factors that are assumed to be present in intelligent activity. Intelligence implies an ability to use past experience in relatively novel situations. It also requires the seeing of the relationships present in the given situation, and their comparison with the earlier experience. 'Alertness' leads to quick responses and goes a long way to ensure success. An intelligent action generally requires all the above processes. However, the total quality of 'intelligence' may include many other less-known factors.

Professor C. Spearman has suggested a mathematical determination of intelligence. He says that if the scores in certain tasks show a particular mathematical relation,<sup>1</sup> then the task contains two factors, an element of general intelligence (*g*) and one of special intelligence (*s*). His students have shown that the statistical analysis of similar test-scores may be proved to show a number of other factors besides the *g* and *s* first described by him.

<sup>1</sup> The value of the tetrad-difference is practically zero, or less than the probable error of the tetrad-differences.

We may here mention that the 'intelligence' tested by means of mental tests involving language is sometimes described as *abstract intelligence*. So, for these psychologists the solution of the task—'White is to snow, as black is to ...?'—requires the activity of abstract intelligence. And the solution of mechanical or manual tasks is believed to be due to the operation of *concrete intelligence*. It is found that some persons can do better in mechanical tasks than in mental tasks. Such persons may be said to possess better concrete intelligence than abstract intelligence, or better mechanical ability than mental ability. We have to confess, however, that so far we do not know what are all the mental processes involved in intelligence. We can be sure only of dealing with a mental ability, which appears in a variety of tasks. So there is an increasing trend to use the term *general mental ability* and to avoid the ancient term derived from a so-called intellectual faculty. We also believe that the mind functions as a whole, and the desire to divide its activity into isolated compartments or faculties is an oversimplification. It seems more correct to talk of mental *abilities*, as well as of personality *attitudes* and vocational aptitudes.

### QUESTIONS

1. What are the different methods for the measurement of intelligence?
2. What are group-tests? In what ways are they better than individual tests?
3. What are performance tests? How do they differ from tests involving language (verbal) tests?
4. What are the important results of intelligence testing?
5. What is intelligence?
6. Write short notes on: (a) I.Q. (b) Idiot. (c) Genius. (d) The two factors *g* and *s*.
7. Describe two tests for finding out the honesty of a servant.
8. Describe any two tests which are commonly employed for discovering the intelligence, character, or aptitudes of other persons.

## Chapter XV

### SLEEP, DREAMS AND HYPNOTISM

#### 1. *Sleep*

We have been discussing so far the phenomena of our normal waking life. But we do not stay awake all day and night. We pass a number of hours in sleep. The absence of experiences during profound sleep, and the experience of strange incidents during dreams, both may be fairly described as quite *different from the normal* waking life. So sleep and dreams may well be described as *abnormal* mental phenomena. The term abnormal is not used here in the sense of 'diseased' or 'unhealthy'. Sleep and dreams are perfectly healthy experiences for a normal man or woman. However, compared with the experiences of our waking life, they may be described as different, or abnormal.

When we prepare to sleep, we usually retire to a room which is not noisy. We take off our working clothes, and put on others which are looser and permit comfortable movement. We darken the room by extinguishing the light, or by reducing the wick of the lamp, for we do not want to be disturbed by it. We also lower our mosquito-net, and cover ourselves with blankets or quilts so that we shall not be disturbed by the attentions of mosquitoes, or changes in temperature. We even close our eyes. In short, we do not want to receive any stimuli from the world around us. We *withdraw ourselves* from the rest of the world.

Further, if a person is sleeping and we go on talking or doing other things in the room he does not know what is going on around him. He seems to be in a state of 'inattention'. His ears are, so to speak, closed to the sounds, just as his eyes are closed to the light (cf. pp. 75-6). But if we begin to talk very loudly or flash a very strong light

upon his eyes, or touch him not very gently, then he wakes up, and he is again able to hear a whisper, and notice even the light touch of a feather. The sleeping condition had *reduced the efficiency of perception* by the sense-organs. This is perhaps due to some checking process or inhibition of the sensory centres of the brain. It is easily noticeable when we are feeling drowsy. Then, if any conversation is going on, we listen to only half the words. Our field of consciousness becomes vague, and our attention seems to be inactive and out of focus. It seems as if our brain is refusing to listen to the sounds that enter our ears. When the brain is only half interested in the outside world and the mind performs only a few processes, then it seems too difficult to attend to the tangle of our ideas. And in a few minutes, we do not exactly know when, all ideas are scattered and lost, and we are fast asleep.

## 2. *Dreams*

While we are sleeping, both our body and our mind are resting. After a long period of sound sleep, we feel quite fresh, although when we fell asleep we were tired out. The rest during sleep gives us new strength to perform the labours of another day. The less we sleep, the less fresh we feel the next morning. So, if any fairly strong stimulus should reach our sense-organs and awaken us, our sleep would only half serve the purpose of giving us rest. It may be recalled that we feel awake only when normal consciousness accompanies the brain processes excited by the sensory impulses. When we are sleeping our skin and ears are receiving their usual stimuli. But owing to some form of inhibition or resistance, these afferent excitations (if any) are too feeble to excite such brain processes as are accompanied by conscious experience. However, as the period of our rest increases, some synaptic resistances are so reduced that the brain pro-

cesses easily become excited enough to be accompanied by some conscious processes. During this period our brain is not in a state of profound sleep, but in a state of *light sleep*. These conscious experiences are called *dreams*. They do not, however, run in any definite order for any length of time. There appears no reasonable connexion or system in the different dream experiences that succeed or follow each other.

*Dreams are usually visual experiences.* This is due to several reasons. *First*, the eye is a very sensitive organ, and its brain centres are also connected with those for the ears and skin areas : so the eye gets excited very easily, even when other organs receive the stimuli. *Secondly*, when we close our eyes, we continue to experience visual sensations of a grey field. These are called the *retinal grey* sensations, and are caused by excitations of the retina through the processes of blood circulation. *Thirdly*, the eye is so frequently used by all of us, unless we are blind, that the visual centres of the brain are far more practised to induce conscious experiences than are the centres for other organs. *Fourthly*, during our waking life our imagination is usually carried on with visual images. The associated ideas are also mostly visual. Hence, we often talk about 'seeing a dream'.

The dream starts during light sleep, when any sensory stimulus is strong enough to excite conscious processes (mostly visual). If we did not begin seeing a dream, but received the stimulus in normal waking consciousness, then our period of sleep and rest would also finish at that very moment. But if we start seeing a dream and go on sleeping, then our body will continue to rest during the period of the dream. So a dream is well described as a *protector of sleep*. Often in the course of a night we see a number of dreams and our body continues resting throughout. It is very difficult to decide whether we see all of them during one period, or whether there are several



periods of dreaming alternating with dreamless sleep. One thing is certain, however, that the scenes in our dream may shift in a strange way to suit the *dream-appreciation* of new stimuli. If a visual stimulus starts a dream, and later a strong auditory stimulus enters the dream field, our dream scene will at once change into situations where noise may be produced, by introducing a noisy procession, or a railway engine, for example ; and a cold stimulus (a breeze) may induce changes to such scenes as bathing in cold water, or walking in snow, etc. The frequent changes in the dream scenes may thus be the result of the different meaning tendencies or apperception processes stimulated by one or more of the sense organs getting excited from time to time.

### 3. *The contents of a dream*

The *dream content* can be easily understood as a combination of several images due to some accident of association. The dream scene is usually a complex image : it may be a room like one we have once seen, with furniture of a kind we have seen at another time, and the people in that room may be those we have met at different places and on many different occasions. The parts of the complex scene are images of our past experiences. Their combination, however, is such as we have never found in our life : hence the total dream situation appears strange and fanciful or fantastic compared to our waking memories. The several dream images that make up any dream scene may again combine in themselves the parts of different experiences. For example, I see a girl in a dream : I know her by the name of X, she is dressed up like Y, and she talks and behaves like Z (cf. p. 132). Hence this image is a *composite image*, or a condensation of several symbols brought about by a peculiar quality of dreaming or *dream-work*. In short the entire dream content can be described as a collection of images and

composite images. The various scenes of the dream follow each other in a curious unfamiliar manner. The successive scenes seem to be held loosely together according to some strange fancy of the laws of association. The experienced dream is called the *manifest content*.

We have said that the function of a dream is to protect sleep, and that the manifest content is due to the accident of the given dream-appreciation of afferent impulses. These in turn may touch off association areas and evoke more or less indirectly connected desires or images of actions. We may also note that if during sleep certain wishes become active, and gain expression in 'dream situations', then our sleep is protected from the disturbing impact of our wishes. A wish-fulfilling dream partly relieves the urges or impulses that seek satisfaction for that wish. For example, I wish to get up early, and go to meet a friend at the station. Now in a state of light sleep, this wish may become active. If that wish is connected into a dream, then I may see myself in a dream drama waiting on the station, looking fresh and well dressed, carrying beautiful garlands, etc. But if my wish is not connected into a dream it would become conscious and give a rude finish to my rest, long before the proper time. It is clear that the *dream expression of the wish gives a practical* though only an *imaginary satisfaction to the wish*. This partly reduces the urgency or energy of the wish, and thus helps us to continue sleeping and resting. Often it happens that when we have gone to sleep after a highly spiced meal, we soon begin to feel thirsty. The situation of thirst may be eased by a dream of drinking water, or bathing in refreshing streams, or drinking something in a restaurant. Again the same facts of dried lips and throat during thirst may lead to the dream of a burglar and our inability to shout aloud for help. Or it may lead to a dream of any other anxious or tragic event in which we find a sudden disability to reply or to attract

attention. In short the same physiological condition of thirst may lead to various kinds of dream situations. We know that different bodily tendencies give rise to different mental interests (cf. p. 82). So the total bodily condition may excite several interests from time to time. Hence the *particular nature of the dream situation depends upon the active mental interests or tendencies of the dreamer*. Indeed there is a common saying : the hungry man dreams of food.

Our affective and conative tendencies towards different objects or persons or situations may well be described as our *wishes*. Hence, the dream expression of these tendencies may be called a *partial* and imaginary gratification of wishes. We must remember that in some dreams the wish that is gratified is simple and easily recognized. But in others, the expression of any *one* wish may be mixed up with the expression of *other* wishes, and the total *symbol* for the wish-system may be very difficult to understand (e.g. the composite dream image of a girl known as X, dressed as Y, and behaving like Z). The difficulty of understanding the manifest dream is very much increased when there is a disguised expression of repressed and unrecognizable unconscious wishes (cf. p. 195).

#### 4. *The meaning of a dream*

We find that the manifest content of a dream is sometimes meaningful. We are doing such things as we do in normal waking life. For instance, 'I am going on my motor cycle along the Ring Road at Delhi.' But there are other dream contents which seem unusual and strange, such as 'I am riding my motor cycle in a valley full of big stones.' There are still other dream events which are physically improbable, or impossible, e.g. 'I am going on a motor cycle up a spiral staircase to a university examination being held in the spire of a church. The moment I reach the top, I find a number of people sitting at desks.

The motor cycle vanishes, and the floor of the room begins to move like a big bus. All of a sudden a number of us are playing on the deck of a steamer, which is just stopping beside a river jetty.'

Have all dreams a meaning? Many *lay* persons think that dreams tell us about the future: this is a common belief that has come down to us from ancient times. But there are others who think that all dreams are false and useless experiences like illusions. There is a third group also who say that only some dreams are meaningful, e.g., dreams seen in the early morning, on New Year's day, or on particular days of the week. All those who believe that dreams have a meaning hold that the *real* meaning is a very different one from what is seen in the dream situation. Sometimes it is simply described as *opposite* to the manifest content; e.g. a happy dream means an unhappy future, and an unhappy or painful dream experience foretells a happy or pleasant future. The gain or loss of loved ones or of property would mean the opposite in fact. All the above theories are non-scientific and non-psychological.

The psychological theories of the meaning of a dream always refer to the nature of the *wishes that gain expression in the manifest dream*. Our wishes are usually concerned with events that lie in the *future*: they may be either 'hopes' or 'fears'. It is to be noted that just as wishes in the *present* refer to the future, even so they too have developed from the *past*. We often wish our 'past' to have been different. Many persons will agree that it would be better for them to re-live their childhood or youth in an improved way. So there are two methods of interpretation. One method tries to discover the origin and the development of the wishes which are present in the dream. It is described as the *analytic* or reductive method. This is generally attempted by the *psychoanalysts*, as the followers of Dr Sigmund Freud call them-

selves. The other method gives greater emphasis to the future, to the hopes and fears of the dreamer in his present situation. It believes that the dream-images express the nature of the future gratifications wished for by the dreamer because of his social complications in the present. It is described as the *synthetic* or constructive method of interpretation. This school is headed by Prof. C. Jung. Both groups agree that many dream scenes have a *symbolic* meaning. But the present symbols are interpreted largely in the light of the past and future by the two groups; the other aspect is also admitted, but it is given only a minor importance.

Further, both groups of thinkers are agreed that the wishes that gain satisfaction in dreams are very different in nature from what is seen in the dream. Let us examine one to illustrate the two points of view. A college girl student related the following dream: 'She is playing with several girl friends; suddenly she finds herself on the brink of a very wide and deep well; there is a big thick pillar to which she is clinging; she feels a little afraid.' From the point of view of Freud, the deepest wish that finds expression in this dream is a common childish fantasy full of infantile anxiety, a repressed castration complex. (Many girls believe that owing to some parental punishment, they have lost the boy's sex organ.) But from the point of view of Jung, this dream is an expression of a present feeling of 'insecurity' due to a fear of the 'dark depths' of evil temptations, and a wish to escape the anxious situation by 'clinging' to the teaching and examples of the 'pillars' of society near at hand. In each case, the dream images are given a different symbolic meaning: the 'playing', the 'well' and the 'pillar' are symbols of very different objects and situations. The wishes that are interpreted as underlying a given dream are said to form the *latent content* of the dream, as opposed to the seen, or the *manifest content*. For a scientific

psychologist the actual meaning of a dream is 'the wish or wish conditions that form the latent content'.

### 5. *The dream wishes*

We have held that dreams give a partial relief through some imaginary satisfaction of our wishes. This view gives rise to the problem of the nature of the dream wishes that lie hidden, and appear in some disguised form in the dream images seen by us. What is the wish that seeks satisfaction during light sleep as a dream? There are many wishes which arise during the course of a day. We satisfy most of them by means of suitable actions; but for some reason or other we have to postpone the satisfaction of some of them. In short we *suppress* some wishes. Those that remained unsatisfied during our waking activities, would be ready to get some imaginery satisfaction in dreams. They may represent strong or weak tendencies, deep-rooted and long-enduring ones, or only passing interests. Only the mental constitution of the individual can decide whether a wish to win a tennis championship or a beauty competition, to eat *rasagullas* or sour grams, represents a strong or a weak tendency. Again, a number of weak wishes in a person may combine together and form a strong as well as a composite wish. The strongly emotional wish-systems about particular objects or activities are described by the term *complex*: thus one may have a complex about one's mother, father, college, sport, etc. (Sometimes this term is used only for the repressed wishes or systems of wishes.) During light sleep it is the strongest unsatisfied wish, or complex of the moment, which is able to enter into the dream. The more suppressed a wish is, the greater will be its tendency for expression in the dream. Also, it is easy for a strongly suppressed wish to gain indirect expression in a disguised or symbolic form; e.g. a child afraid of being refused an extra sweet will often remark that his friend wants an



extra helping ; a strongly disciplined child may dream of defeating his parents or teachers in a game of cards or football.

When a wish or group of wishes is so strongly suppressed and kept out of the conscious field that we do not recognize nor remember it, then its existence can be inferred only from its expression. Such wishes are called *repressed* wishes. These are often irrational, and for immoral, anti-social or unworthy deeds or objects ; e.g. jealousy of, or desire for the death of, one's father, brother, or sister, etc. It may be noted that the suppressed wishes can be recalled, and they are supposed to remain on the outskirts of the conscious field, in the *fore-conscious* or *pre-conscious* region of the mind. But repressed wishes and ideas, being not known to the individual, are a part of his *unconscious* mind. They cannot be recalled by conscious effort. Repression also disturbs the recall of ideas and acts associated with such repressed wishes.

It is to be noted that the ideas and their associations do link up the various wishes within a given wish-system. The emotions and affective tendencies for different actions may combine with more or less similar trends in other areas of social activity. For example, anger at his parents' dominance is repressed by the child ; but the anger of the adult at an assumed injury done by his boss, employer or supervisor may not be repressed : it may be merely suppressed. These two wishes, one *repressed* and the other *suppressed* may get linked together. The status of a repressed wish depends upon the quality and strength of its emotional loading. The stronger an anti-social wish, the greater is the need for strength among the opposite repressing wishes. The latter are sometimes called as a system, the *censor* or the *ego-ideal*. It is our social ideals and their emotional character that oppose the anti-social desires.

When any brain centre is excited enough to start a

dream, the strongest wish-system at the moment is sure to make that sensory excitation an occasion for finding its own expression, or imaginary satisfaction. The sound of the alarm bell of a clock heard by a Christian may be made into a dream of the church bells calling to prayer, or ringing merrily for a wedding, or tolling for the death of someone. The same auditory excitation may be translated by another dreamer as the bell of his college, or the bell of a fire brigade. It is essentially the mental condition of the moment that decides whether a sound stimulus is appreciated as the mid-day cannon or whistle, or the tinkling of a dancer's feet, or the counting of silver rupees. For this reason, dreams can in certain cases be utilized for finding out the nature and strength of a man's wishes, or systems of wishes, or of his complexes. This method of dream-analysis is often used in the investigation and cure of mental disease. We must also note that our wishes and wish-systems are not so many separate bits of our minds. They are more or less well-knit, and form a fairly unified structure or make-up in the normal mind. It is only for convenience of discussion that we describe them as distinct and separate kinds of mental activity.

## 6. *Hypnotism*

The hypnotic phenomena have long been known under the names of 'animal magnetism', 'personal magnetism', 'spirit-power' and 'mesmerism'. The state of *hypnosis* is a sleep-like condition, which is induced by suggestions from the *hypnotist*, and it makes the *hypnotized subject* highly suggestible by the hypnotist. Dr Janet of Paris found that hysterical patients could easily be induced into a sleep-like condition, after which they felt better. So he thought that hysterics were susceptible to hypnosis. It was soon found that the state of hypnosis could be made so deep that the patient became insensitive to touch, movement or pain. During ordinary deep sleep also we

can see a *wax-like* unresisting condition of the muscles. After a certain stage of falling asleep, if a child's posture be gently altered, there is no disturbance of the sleeping state. Some adults sleep so soundly that as a practical prank you can easily carry them in their beds and leave them at a distance. In deep hypnosis a similar state can be induced in the patient ; it is called *catalepsy*. When this deep hypnotic condition is removed, the patient has only a very hazy memory of all that may have taken place while it lasted. Janet also found that in some cases the hypnotic condition could be made still deeper, and the person could be made to perform all sorts of curious actions. For instance, if a deeply hypnotized patient is given a glass of clear water, and is told that it contains beer, or champagne, he readily agrees with the suggestion. He drinks the water with great relish and declares it is delightfully bitter, or delightfully sweet. If a deeply hypnotized patient is shown a chair, and it is then suggested to him that the chair is a good horse which he will enjoy riding, then the patient will sit on the chair and perform the movements of riding. His behaviour is like that of a person walking in his sleep ; so this stage of profound hypnosis is often described as the *somnambulistic* stage. On waking from the state of profound hypnosis, the subject has no memory of all that occurred during that period. Thus the different stages of hypnotism may be described as, (i) light hypnosis, (ii) catalepsy and (iii) somnambulism. They may be distinguished according to the clearness of their memories. After *light* hypnosis a person feels as if he has had a short nap : he remembers the activities during that state, if any, as a vivid dream. The state of *catalepsy* leaves hazy memories, like those after a vague dream. After the stage of *somnambulism* there are no memories ; the situation is beyond the field of conscious recall. But it can be remembered if suggestions are offered.

Usually the stage of catalepsy is a test for the readiness of the patient to receive therapeutic suggestions. But often the somnambulistic stage is desired for bringing about medical cures. If a man is a habitual drunkard, he can be made to give up the habit by a suggestion against taking liquor, made in the state of profound hypnosis. In the same way we may give suggestions against gambling, or the display of symptoms of hysterical fits. Such suggestions for curing a person are called *counter-suggestions*. Generally their effects are remarkable. The person who is given proper suggestions leaves off drinking, gambling, or having hysterical fits. But in a short time, say a year, he may develop some equally bad habit, e.g. horse-racing, drug taking, or hysterical pains. Hypnotic suggestion is found to be forceful enough to suppress or remove a specific habit or symptom, but it does not usually remove the root cause of the evil, for the very simple reason that the hypnotist himself is ignorant of the root cause. Sometimes however hypnotic suggestion is used for discovering the origin, or root cause of a malady. Such a technique of using hypnosis for analysis and cure is known as *hypno-analysis*. Sometimes a profound state of hypnosis can be easily induced by the use of drugs (chemical tranquillizers, etc.); and this technique is known as *narco-analysis*. Often the cure requires an adequate measure of psychotherapy.

### 7. *Rapport*

Hypnotism may be described as a peculiar kind of relation between the hypnotist and the hypnotized. The latter is said to be in *rapport* with the hypnotist : he is in such a condition that he at once accepts every suggestion given by the hypnotist. Usually we accept suggestions after due criticism. If somebody tells us that the horse of Rana Pratap could eat the enemy's iron swords, we shall refuse to believe it. But if he tells us that this horse

could run fifteen miles in half an hour, we shall be more disposed to accept his statement. Our belief generally depends upon our previous experience, and our opinion of the person concerned. If a learned doctor tells me that my lungs are weak I will at once begin to take more care of myself. But if a person ignorant of physiology and medicine suggests that my heart is weak, then I may lay a bet to run a quarter mile and prove him wrong. In short, we accept certain suggestions without any criticism, and we accept others only when we have no suspicion of or criticism against them. Further, there are some people from whom we accept suggestions without any criticism in certain fields only, e.g. a child easily accepts his parents' opinions about the neighbours; but he may not accept their opinion about the colour or quality of his own clothes or toys, or the merits of his friends.

The relation of *rapport* is one of uncritical acceptance by a person of suggestions from another. It exists between *two* persons only, and during the hypnotic condition no suggestions from others are readily accepted in the same uncritical fashion. However, it is at times possible to *transfer* rapport through specific suggestion. It may be further noted that for establishing rapport it is not necessary to be in a sleep-like state. It can take place during waking life also, as does the rapport between a mother and her child. The phenomenon of rapport may be described in a general way as a case of concentrated attention or a special attitude. But during hypnotic rapport we attend to the suggestions of the hypnotist in a special sense. We attend to no other ideas or processes. It seems as if we withdraw ourselves from the rest of the world, and are open to suggestions from and through the hypnotist only. Hence his suggestion is received as an irresistible force, and it is at once acted upon.

Sometimes certain suggestions are given for an action to be performed many hours or even days after the hyp-

nosis. These suggestions are called *terminal suggestions*. These are usually the last suggestions to be given to the subject. If a hypnotized patient is told that tomorrow at ten-thirty he will put on his overcoat, then, at the proper time, the subject will feel uneasy and perform the terminal suggestion. It is difficult to prevent him from doing so, although he cannot give any good reason for his desire or action. An inadequate reason is called a *rationalization*. It often occurs after the action, almost as an after-thought. It also points to the existences and activity of unconscious or unknown urges, etc.

### QUESTIONS

1. What are the characteristics of sleep from the point of view of psychology?
2. What is the condition of sleep when we begin to see dreams?
3. Why are dreams usually visual experiences?
4. In what sense can a dream be described as a 'protector of sleep'?
5. What are composite images? Give examples from your own dreams.
6. What is the difference between the 'manifest' and the 'latent' content of a dream?
7. In what sense do you think a dream has a meaning?
8. What are the different views about dream wishes?
9. Write short notes on 'suppressed' and 'repressed' wishes.
10. Write short notes on the 'fore-conscious', and the 'unconscious'.
11. What is hypnotism?
12. What is rapport? Give three instances from your own observation of non-hypnotic rapport.
13. Write short notes on terminal suggestion and counter-suggestion.



## Chapter XVI

# PERSONALITY, MENTAL DISORDERS AND PSYCHOLOGICAL MEDICINE

### 1. *Personality*

We often distinguish persons from things. Living human beings are generally referred to as *persons*. Objects like chairs and tables do not possess the character of persons, as they are almost entirely passive in their relations with human beings or persons. Chairs and tables do not ask or force us to sit on them or use them : they are *things*. The lower animals like dogs and cats are at times accepted as a part of the human being's world, if it suits the individual's fancy. We may pay some attention to the mental situation of the animal, when we play with him. But mostly we do not bother much about the form of the 'self', or character, of the lower animals. However on intimate acquaintance we often recognize the individuality, or the characteristic temperament of a particular dog or cat. But we usually hesitate to ascribe a full-fledged personality to lower animals, even when they are our own pets. We seem to treat them as complex 'living' mechanisms, that are to be used as convenient tools to satisfy our purposes. Indeed we often behave as if they had no self, or character, or personality.

The individual human self often enters into various relations with other human selves. This relation of a self to another self, or a group of selves, transforms the individual into a *person*. When we consider a man from the aspect of his relations or reactions to society, then we describe him as a person. The individual self at any moment is a perception, thought, memory, emotion or wish. But *person* is a broader term, and it implies a longer history. It is rather the individual perceiving, thinking, remembering, feeling or wishing another object or

individual with his social background. Thus it is the general character of an individual's socialized responses or attitudes, that expresses his 'personality'. It will show its peculiarities in his habitual appreciations and thoughts, in his common wishes and typical behaviour; specially in his habits of adjustment and interaction with his society (cf. p. 145). In other words, the peculiar quality of the *person* is called *personality*, and is expressed in the typical pattern of relations between the individual and his society.

In the case of the reflex or instinctive behaviour of a man, we do not think of his personality. But we do think of a man's personality when we refer to his social behaviour. In a public meeting, at a garden party or a picnic, we can describe one person as having a dominant personality, another as a cheerful one, and a third as retiring. The words 'dominant', 'cheerful', and 'retiring', refer to the man's behaviour as a whole, and are general remarks rather than special judgements upon one or two incidents only. We should remember that the dominating person is not one who never acts in a humble or obedient manner; but one who mostly shows a habit of dominating over others. He may be a speaker or in the audience, a host or a guest, a senior or a junior member; his behaviour shows his dominating tendency in many ways. In the same way the cheerful man is in the habit of keeping cheerful under most circumstances.

A question may be asked here. *Why is it that personalities differ in quality?* The answer is quite simple: the differences are either because individuals are born with different well-developed tendencies; or because in some the development of certain tendencies is strongly encouraged, while that of others is greatly checked, by their family or group environment. For example, a child B does an act well, and he is praised. So the next time there occurs an opportunity to do something similar he is

eager to show off his abilities and to gain the sweet rewards of praise. Now let us consider another child C, who is not much praised, and usually does not receive even the promised reward. He will consciously or unconsciously begin to consider the evasion of a thankless task as a superior habit. C will do only what he has to do. He may be efficient, but he will not care to show off his efficiency; for his earlier experiences were either bitter, or not encouraging. When these two children grow up, their ways of behaviour will become habitual. B will develop a co-operative and loyal personality, while C will be of a retiring and critical disposition. Indeed it is well known that the treatment of the elder child, or the only child in the family is unusual. An only daughter is also often the pampered pet, and she is suspected of obstinacy and is somewhat difficult of adjustment.

The development of a personality depends largely on the interactions of the following major factors: physique, physiological tendencies and social environment. The *physique* of a person largely depends upon his health or physiological tendencies, which play upon the heredity of his body: a man may have premature grey hair, a strong body, a healthy skin, or a pale face. In other words, the physical condition (or physique) that can be seen by other persons in society is to a large extent determined by the functioning of the glands within the body. The *physiological tendencies* or the various glandular secretions produce chemical changes within the body, and these may lead to strong or weak *drives*, or urges towards particular objects, e.g. an individual may have over-active or under-active sex-glands, or thyroids, or digestive apparatus. These would determine the tone of his interest in sex or food. Prof. R. S. Woodworth has described the chemical aspect of an individual by the term *chemique*.

His physico-chemical *needs* impel the individual to make certain *demands* of his society. These take the form

of his wishes, which are often more or less ill-expressed. The social group usually meets only some of these demands, but at the same time it expects the individual also to play a certain part in the group, and to follow common customs and current social rules. Society's estimation of the needs of any individual, and of his fitness for a role in the group, depends to a large extent upon his physique, his looks and size, his activity and capacity, etc. During his social life, the person finds that certain ways of behaving or adjustment are successful in bringing to him the highest satisfaction. One may find the way of obedience, and another the way of revolt to be the most satisfactory. One may be docile and submissive, while another may be dominant and aggressive. Thus each social individual or person learns to control a number of his desires or tendencies, to avoid friction with his society. He learns the relative importance or evaluation of his wishes and demands in different social situations. He discovers the opportunities for a convenient satisfaction of his needs. And he begins to understand other situations, where it would be prudent to retreat, or fight bitterly. In short, he has to keep his desires or actions in a certain order, or *system*, to lead a successful life in society. In this sense, each personality is the result of the *systematization of the different wish-tendencies in an individual*. It is accepted that our wishes derive their energies from suitable *affective dispositions*. Hence, the shape of any personality is largely moulded by the organization of his sentiments, or affective tendencies (cf. pp. 175-6). The organization of wish-tendencies is *also* considerably influenced by the character of one's *cognitive dispositions*, or the systematization of the individual's habits of perceiving and knowing. In short, the individual's personality is a general expression of the unique pattern of his wishing, feeling and knowing tendencies. When all the opposing or conflicting wishes, feelings and

ideas are kept within the influence of a unitary organization, we have a single unified or integrated personality. If the organization is loosely held together, we have a weak personality, that exhibits strongly emotional behaviour at odd unexpected moments. When this systematization is inflexible, we have a strong and determined personality: the emotions are kept in check and regulated. In a *normal* person, the various groups of approved, suppressed and repressed wishes are kept together in a harmonious manner. (It may be because the repressed wishes are very few, or are very weak.) But if this harmony breaks down, if the organization becomes not unitary, nor orderly, then we meet with 'disorders of personality'.

## 2. Disorders of personality

The desires that are kept unsatisfied are usually of an anti-social (or unpractical) nature. We know that these suppressed or repressed desires do get some satisfaction in dreams; they may also gain in strength, and then produce disturbances in waking life. Let us take the case of a woman who leads a fairly normal life. She has many wishes, and while she satisfies some, she finds it necessary to suppress, postpone or reject others. Some of the rejected impulses may become repressed and *unconscious* in due time. For instance, she wants to buy a particular ornament (a special type of earrings), but her budget does not allow it. In due course, this wish becomes repressed and not conscious. She will then never talk about, or even be able to recall the earrings, because the wishes connected with them have got separated, or *dissociated* from the main personality. Now these repressed wishes become strong by joining a group of other suppressed and repressed impulses, for example, the infantile jealousy of her sister. This strong repressed wish-system cannot directly express itself in the conscious life of the woman because of the strong repressing forces or impulses opposed against

it by the *ensor*. But this tension and activity (or *dynamism*) of the unconscious may find an indirect expression, and disturb the waking life of the woman; she soon begins to complain of a headache and a pain in the ears. Her normal way of living is greatly disturbed, but no amount of medicine is able to provide any relief. So her family and society become more attentive to her. She does not get the new earrings, for the pain in her ears makes her give up the use of any kind of ear ornaments. But she does get *sympathy*, and perhaps promises of other substitutes, like ornaments or activities. The abnormal behaviour gives her a great deal of pain, but it also gains her a certain *compensation* in her common social life. We have taken this illustration of a simple case of *hysterical pains*. We find how certain mental conflicts or frustrations can lead to bodily disorders. Modern medicine recognizes a large variety of *psychosomatic* disorders.

It is also held that *hysterical fits* are occasions for the disturbance of the normal personality through the accidental activity of repressed wishes or complexes. The psychologists have little doubt that it is the conflicting unconscious wishes which express themselves in more or less severe disturbances of bodily functions. But it is not easy to penetrate the disguise of the wishes when they have been *converted* into bodily symptoms. There is a special method of therapy called *psycho-analysis*, which is employed to deal with many kinds of *functional disorders* due to mental disease. This method tries to discover through free associations the root-cause, or the origin and development of the hysterical fits, and is able to remove or destroy the repressed complexes. In certain cases drugs as well as hypnotic suggestions are also used to cure patients.

We have seen that repressed wishes cannot be recalled, and that they are opposite in character or form to the normal, socially approved activities. Sometimes the



repressed wishes or impulses may form relatively independent systems of wish-tendencies or *complexes*: these are assumed to have a more or less unitary organization, like that found among common wish-systems of the fore-conscious. But there are no common ideas or memory-links between these complexes and the main personality: so they are described as *dissociated bits of personality*. These are usually fairly big parts or streams of the individual's total activity, but they move in their own channels at some distance from the main stream, so to speak. If and when these dissociated complexes are able to force entry into consciousness, they are likely to dominate the entire field of activity, and appear to disturb the individual's normal ways of living and adjustment with his society. We must note that such an entry of the dissociated complexes is possible only when the usual repressing systems have been weakened, or tricked. Hence the person behaves abnormally. If these complexes remain dominant for a fairly long time, for days or months together, then this would be described as a serious disorder of personality. For example, a man normally quiet, retiring and industrious, may have repressed the opposite tendencies. When the repressed tendencies come into their own, he may become careless and merry, with a fondness for practical jokes. In our ordinary common life we can notice a similar change, when a man drinks too much. These chemical changes seem to suppress his normal social habits, and excite the repressed complexes for fighting, shouting, or other ways of unusual self-assertion.

Sometimes the abnormal behaviour continues for a few weeks or months, and then a return to the earlier type of normality is again noticeable. But there is a more or less complete absence of memories for the period of abnormal behaviour. Such a lapse of memory is called a *fugue*. We find common examples of such cases outside the hospitals, resulting from extraordinary and entirely unexpected

strokes of good or bad luck : there is a sudden and steep gain in speculation ; somebody wins the Derby Sweep ; or loses all his wealth in a boat disaster ; or loses all his near and dear ones in an earthquake. In those cases where the changes from the normal to abnormal sets of behaviour recur many times, each change being maintained for some weeks or so, we have cases of *alternation of personality* : an interesting illustration is provided in the story of *Dr Jekyll and Mr Hyde* of an alternating or a *double personality*.

Sometimes there may be a number of almost equally extensive and strong wish-systems or separate bits of personality. Only one of them is taken as the main personality, but the others may alternate at suitable intervals : the total behaviour of such an individual would exhibit a case of *multiple personality*. However, if this division of behaviour becomes very great, then so-called normality would be noticed very rarely ; we will rather witness isolated bits of dissociated behaviours ; a complete break-up or *disintegration of personality*. In such cases it is idle to talk of a personality, as there is a complete absence of a unitary system of wishes. This is the extreme case of a mental disease called *schizophrenia* (or dementia praecox). It is at times an incurable kind of insanity (or mental disorder), though some relief is possible through the proper use of modern drugs.

### 3. *Mental disorders*

It has been estimated in America, that among any 500 city people, about 15-20 would be considered *abnormal*. Of this group 3-4 may be feeble-minded, some 3-4 may be criminals or delinquents, 1 may have epilepsy, about 3-4 may be insane, while 4-5 would be neurotic. This gives us some idea of the extent and distribution of mental disorders. The types mentioned above have many varieties. In this book we will briefly deal only with the better-

known types of abnormality. We will put them into two broad classes : the *organic* and the *functional* disorders. In the organic group, we have all those mental illnesses that are directly related with some defect of the body. In the functional group are all mental disorders that have no recognizable bodily basis. Medical men are busy trying to tackle the latter by suitable drugs, and other electrical or chemical shocks. They hope to catch the elusive bodily basis by such procedures. The clinical psychologists however try to treat functional disorders by more or less psychological techniques, like psycho-analysis, suggestion, re-education, etc.

(i) In the *organic* group of disorders, we should note whether the bodily defect or brain injury is of a sudden and serious kind, or the result of a continued process of gradual degeneration. We can notice the failure of memory and intelligence, hallucinations of hearing, touch, etc., a sort of irritable peevish tiredness, or terror due to mental confusion, as well as to emotional over-reaction, etc. Examples of a sudden onset are met in conditions like delirium during high fever ; here the physical condition is reversible, and recovery is probable. The slow growing damages to the brain lead to intellectual confusion or *dementia*, whether among young or old (senile). Organic changes of the brain are usually noticed in blunted, shallow and variable emotional responses. A disease of the central nervous system caused through syphilis infection is called the *general paresis of the insane* (GPI) : we find here a special blunting and coarsening of the entire personality ; the emotions are often extravagant but unrelated to the patient's behaviour, e.g., a patient of Dr Stafford-Clark was giving meaningless cheques for millions of pounds to him, and also to several nurses for stabling his racehorses in their dining room. At the same time he was angry and quarrel-

some, because he suspected his wife of being frequently unfaithful with the doctor.

*Epileptic fits* are also caused by organic injury of the brain, or by the accumulation of poisons in the body, due to acute fever, intoxication, etc. In some cases these convulsive seizures cannot be associated with any known cause, and then they are described as *idiopathic*. But the hypothesis of an epileptoid personality is not accepted. Mental or intellectual deterioration, if any, is not due to organic injury, but rather due to the individual's reaction to his illness. With proper medical care and treatment, the seizures can be arrested, or reduced ; and there will be little or no permanent mental impairment.

*Mental deficiency* is described as a ' condition of arrested or incomplete development ' arising from inherited causes or acquired through disease or injury. An *idiot* is incapable of taking care of himself ; he may fall into a fire, or spill boiling water over himself, etc. He cannot learn to clothe or feed himself. His I.Q. is below 20, and his emotional responses are very crude. *Imbeciles* can learn certain routine, automatic tasks. Usually they are happy and dependent, as well as susceptible to affection and care. But emotionally they are immature and unstable : they may commit sexual crimes or violence with little concern or remorse. This has led to the classification *moral defectives*. Their I.Q. is 20-50 ; and they cannot deal with abstract thought. The next group is that of the *feeble-minded*, who have an I.Q. of 50-70. They can learn some things from special schools, and can perform more or less routine tasks: They can adapt themselves to society fairly well, until they are faced with severe stresses and strong emotional demands.

(ii) The *functional* group of mental disorders can also be put into two broad classes : the *neuroses* and the *psychoses*. Although some hold these two to be different in degree only, some remarkable differences are also found,

The neurotic has some insight, and he is anxious to talk about himself and his peculiarities. But the psychotic is unconcerned, and he has to be compelled to seek treatment and medical care. We can broadly classify the functional disorders as follows: (a) disorders of emotion, (b) disorders of thinking, feeling and adjustment to the external world, (c) predominantly behaviour disorders.

(a) The *disorders of emotion* fall into two big classes: anxiety or depression, and elation or mania. The *neurotic anxiety* is similar to that which befalls the normal person; but these *affective disorders* are extremely persistent, they refer to almost everything and seem to be without any reasonable or recognizable cause. The bodily changes during *anxiety neurosis* are also similar to the normal anxiety behaviour, but as they continue for a very long time, they create a curious distaste for food, an inability to sleep, and a keyed-up feeling of constant panic. The patient may infer the origin of his illness in specific threats or feelings of insecurity; or imagine their basis in physical conditions, nervous exhaustion, etc. Sometimes the fears are of special situations, and called *phobias*, e.g. fear of closed spaces (claustrophobia), fear of open spaces (agoraphobia), etc.

*Depression* is a common effect of some severe cause for grief, like the death of a near one, or keen disappointment in one's cherished hopes and aspirations, etc. But persistence for a very long period would put it in the class of mental illness. When the depression is in response to a known cause, it is called a *reactive depression*. There is a withdrawal of interest from the outside world, and a suicidal feeling that life is not worth living. In some cases, the depressive mood is mixed with anxiety, and these *psycho-neurotic* patients usually blame other persons or circumstances, and demand help as well as protection. It may be noted that depressive disorder is rare in children,

but it is often found in later maturity and called *involutional melancholia*. Such patients make repeated complaints and often have delusions of physical injury (hypochondria), e.g. 'I have no memory'; 'my wife has eaten away my brain'; 'my stomach has been removed and my body is filled with cement and iron', etc.

The opposite of depression is elation, which in extreme cases becomes *mania*. The illness in its mildest form is called *hypomania*. We find herein an elevation of mood, and an acceleration of the stream of ideas and thinking, indicated by a press of talk or a flight of ideas: a few logical but several irrelevant, clang associations. The patients are restless and excitable; they plan a hundred tasks, but each is incoherent and it is left incomplete. While they often appear full of gaiety and goodwill, the slightest restraint or opposition incites them to irritability and violence, both oral and physical. In its severest form, *mania* may lead to murderous assaults, and exhibit delusions and hallucinations.

Some individuals show a profound alternation of moods; sometimes they are highly elated, and at other times much depressed. This condition is sometimes called *manic-depressive* disorder, or *cyclothymia*. In some cases, the two moods follow one another; but in others there is a period of normal behaviour intervening between the two moods. With modern medicines and care there are considerable chances of improvement and cure.

(b) The *second* big group of functional mental disorders is known as *schizophrenia*, which literally means a splitting of the personality, or a disintegration of its emotional stability. This illness is found among men who have to undergo severe strains and stresses, as in war, face to face with a strong enemy. They seem suddenly to break into pieces, perhaps due to some streak of a hereditary handicap, or some shock or injury during infantile development. Sometimes severe stresses of adjustment



during childhood or adolescence may also provoke similar illness. Indeed the symptoms are similar to some organic diseases, and may be produced by drugs like mescaline. The main symptoms are a disorder of thinking, hallucinations, emotional incongruity, and disturbed impulses or conduct. We will consider them briefly : a patient has *ideas of reference*, he thinks that everything is related to him in some special way : the smoke from the neighbour's chimney is a secret code ; the visits of the postmen to other houses, even the bus advertisements, etc., all are elements in a world-wide conspiracy about him, his past and his future. There are curious incongruities in his thought, e.g. ' I want two wives, I will tie them to my ears ' ; ' there is coffee for breakfast, I will not wear stockings ', etc. There are many varieties of hallucinations : often there are mystical visions, invisible sexually-seductive touches, abusive threats or prophetic voices, etc. All these help his belief in an unreal world.

His *emotional incongruity* is most striking. He will talk of the recent murder of his wife, but with a smile ; he will seek your help to meet the conspiracy hatched against his young daughter, while busy with his hair-comb ; etc. The schizophrenic has a strong love and an intense hate for the same person ; he may show intense joy and deep sorrow in the same situation, or exhibit a rapid alternation of emotional ups and downs. Such behaviour is eminently bizarre and unintelligible, as chaotic as the world of dreams (Jung). It is ambivalent behaviour.

Schizophrenia has three main forms : (i) *Hebephrenic* or simple, which occurs in early youth, continues for a long time and is often converted into dementia ; (ii) The *catatonic* form, including the wild, unintelligible postures and activities of the insane, often alternating with periods of complete withdrawal or stupor ; this is often curable although the attack may continue for

weeks or months ; (iii) *Paranoid* disorder, well-known for delusions of persecution or grandeur, which are quite logical and systematic, but *not* based on facts. The man discussing the danger to his daughter never had any daughter. The man with delusions of grandeur imagines everyone who visits him as the governor of the state ; he is sorry to see His Excellency walking on foot ; he had sent six aeroplanes to bring his guest ; he bids His Excellency welcome to his *zamindari* ; others present are his retainers, or *darbaries* ; etc. The fact is that this man was never a landlord, nor acquainted with any governor. It may be noted that minor forms of the paranoid delusions are found among normal people. Persons with some doubts, or feelings of shame or guilt, often *project* them on to others, saying that they are abusing them for being dirty or nasty. In extreme cases, it is very difficult to treat paranoiacs.

(c) The disorders which are largely of behaviour are nowadays brought under the wide category of *psychopathic personality*. They include obsessions, hysterias and character disorders. In the case of obsessional or obsessive *compulsive disorders*, the patient complains that he is compelled to follow certain *ideas* or *impulses*, which he dislikes but cannot resist. The obsessive actions appear like meaningless rituals, e.g. touching every lamp-post, or walking on lines only of the pavement, or never on the lines, etc. Some persons go on repeating verbal formulae in all sorts of irrelevant situations. Occasionally the patient is suffering from *images*, or scenes of horrible or disgusting situations—the proverbial fear of the old maid at the image of a man under her bed, etc. Obsessional impulses to stab or smash are quite disabling for guardians of children, etc., as it may compel them to stay away from their jobs or duties. Obsessional patients tend to be depressed, as they know that their pre-occupations are

silly and useless, and also admit their own helplessness and despair.

*Hysteria* is believed to be the most *psychogenic* mental disorder: its causes are essentially hidden in emotional conflicts; and the bodily changes, if any, are reversible and complete recovery is possible. It is easy to discover a certain small advantage to the hysteric in his (or her) symptoms; but the gain seems to be illusory, in view of the pain and other handicaps suffered by him. Hence hysteric behaviour is often mistaken for malingering, or a lame excuse to avoid unpleasant or probably difficult situations. But while real malingering is rare, real hysteria is relatively common. The form of the hysterical illness or *fit* is known to symbolize the nature of the emotional conflict, as well as the patient's unreal or fantasy solution to escape the sense of guilt or frustration. For example, a young woman had lost her father in early childhood. She was an only child. She was married and for some time lived happily with her husband, the keeper of a sweetmeat shop, some miles away from her parental village. After some time the bride returned to her mother, who had been living all alone. Soon afterwards the husband also came and strongly urged the mother-in-law to let his bride return with him. The young wife was much torn between her emotional attachment to her mother, and love for her husband. Some weeks after her return to the husband, she developed some pains in her legs which soon became a curious occasional paralysis of the lower limbs (paraplegia). In a sense, this denial of her married happiness was an escape from her deep emotional conflict. She was with her husband, and yet had reverted to the sexless life in her mother's house. For a couple of years she was treated in vain by general practitioners in medicine. The insight of a medical psychologist worked a miraculous cure, with the help of some sedatives and a programme for her

staying at the two villages in turn. It may also be noted that sometimes hysterical illness indicates an early stage of schizophrenia, or of organic brain disorder.

*Psychopathic personality* is noticed more in the conduct and adjustments of the patients than in their mental disorders of thought or feeling. The sufferers include the types that always fail in life, and easily slip into deceit and fraud; those who force others to lead anti-social and shameless lives, and live upon their earnings; the spongers, who live like parasites upon the earnings of others; criminals that go on repeating old crimes, without gaining anything from repeated punishments, but only getting worse with the passage of time. The psychopathic disorders are noticed first at the adolescent stage, and seem to continue all through the life. The psychopaths' *electro-encephalographic* records seem to show a typical pattern of immaturity noticeable in similar records of children. Emotional immaturity is their most common characteristic. They are careless of consequences, unable to learn from harsh experiences, incapable of persistence for long periods, insincere and volatile, they practise double standards and are frequently rebellious, they are selfish and unhappy. While some of them are below average in intelligence, quite a few are above average; but even an occasional outstanding success is soon lost through violent emotional behaviour; and many drift into drugs and prostitution, or commit suicide. Sexual perversion is often seen, though there does not seem to be any necessary relation between psychopathic behaviour and perverted sexuality. The latter is probably a symptom of emotional shallowness, a weakness for a momentary gain, a lack of maturity and carelessness of social codes or responsibility. We can divide psychopaths into two broad groups, the *aggressive* and the *inadequate*. Both are unable to check their violent emotions and antisocial impulses, although they may much repent

their misbehaviour. Psychopathic personality or character neurosis is infinite in its variety; it is a challenge not merely to medicine but also to mankind.

#### 4. Psychological medicine

It has long been known that certain foods and drinks or their chemical principles produce noticeable mental changes. The use of these drugs has been very much improved in recent times. In the last Great War the German army used *psycho-tonic* medicines for its armoured divisions, shock troops and night fighters to stimulate their mental activity, raise arterial blood pressure and to avoid sleep. The American army later on also used *sedatives* to release the suppressed or repressed emotions of soldiers that had undergone a state of panic: this method of *abreaction* was found particularly useful with persons soon after they had suffered severe shock. Thus shock amnesia is removed and the personality is easily integrated. Recently a large group of chemical *tranquillizers* has been found, which are specifically useful in neurosis. There is a new era of researches in psychochemistry, or of psycho-pharmacology. Prof. Jean Delay\* has grouped all these tranquillizers, sedatives, and hypnotics as *psycho-leptics*. These include the alkaloids extracted from the Indian drug *sarpagandhā* (*rauwolfia serpentina*). The opposite group of psychotonics is called *psycho-analeptics*, e.g. amphetamines, benzedrine, etc. Lastly, he names the group of *psycho-dysleptics*, or disturbers of the mental processes, which cause hallucinations, de-personalization, etc., e.g. Mandragora, Indian hemp, etc.

The use of *sedatives* is helpful in cases of mania, excitement and anxiety. The *exciters* are useful in depression, and fatigue situations. Modern chemistry has prepared several drugs of varying intensities, and of

\* Escoffier-Lambiotte—'Psychochemistry', *La Medicine en France*, Vol. VII, No. 2, March 1959, pp. 5-7.

specific effects. A variety of psychotic disturbances have been much relieved by the use of certain alkaloid preparations of rauwolfia, and of other derivatives of phenothiazine, etc. Thus psycho-therapy is becoming more sure and optimistic about dealing with all sorts of mental disorders. The severe attacks of schizophrenia are much ameliorated through the use of adequate drugs. The dreaded psychoses are fast being brought within the field of curable illnesses. The general paresis of the insane, once believed to be incurable, is now readily brought under control, if reported early, through the use of psychological medicines, as well as the treatment with penicillin, etc. All this indicates the great advances made possible for psycho-therapy by the development of reliable modern drugs. It also shows the merits of a thorough knowledge of the bodily activities that can help in dealing with psychological behaviour.

### QUESTIONS

1. What is personality? How does it develop? What are the main factors that help the development of personality?
2. How do we get disorders of personality? How can they be removed?
3. What are the organic groups of mental disorders?
4. What are the main groups of functional mental disorders?
5. Discuss the chief causes of hysteria.
6. Discuss the symptoms of psychopathic personality.
7. What are the different types of medicines available for use in mental illness?



## BOOKS FOR FURTHER STUDY

1. M. R. HARROWER, *The Psychologist at Work* (Kegan Paul)
2. H. CRICHTON-MILLER, *The New Psychology and the Teacher* (Jarrolds)
3. E. B. TITCHENER, *Text-book of Psychology* (Macmillan)
4. W. McDUGALL, *Psychology: The Study of Behaviour* (Home University Library)
5. E. JONES, *Psycho-Analysis* (Benn's Sixpenny Library)
6. J. C. FLUGEL, *A Hundred Years of Psychology* (Duckworth)
7. C. SPEARMAN, *Creative Mind* (Cambridge University Press)
8. L. WYNN-JONES, *Introduction to Theory and Practice of Psychology* (Macmillan)
9. C. LANDIS and M. M. BOLLES, *Textbook of Abnormal Psychology* (Macmillan)
10. STAFFORD-CLARK, *Psychiatry Today* (Pelican)

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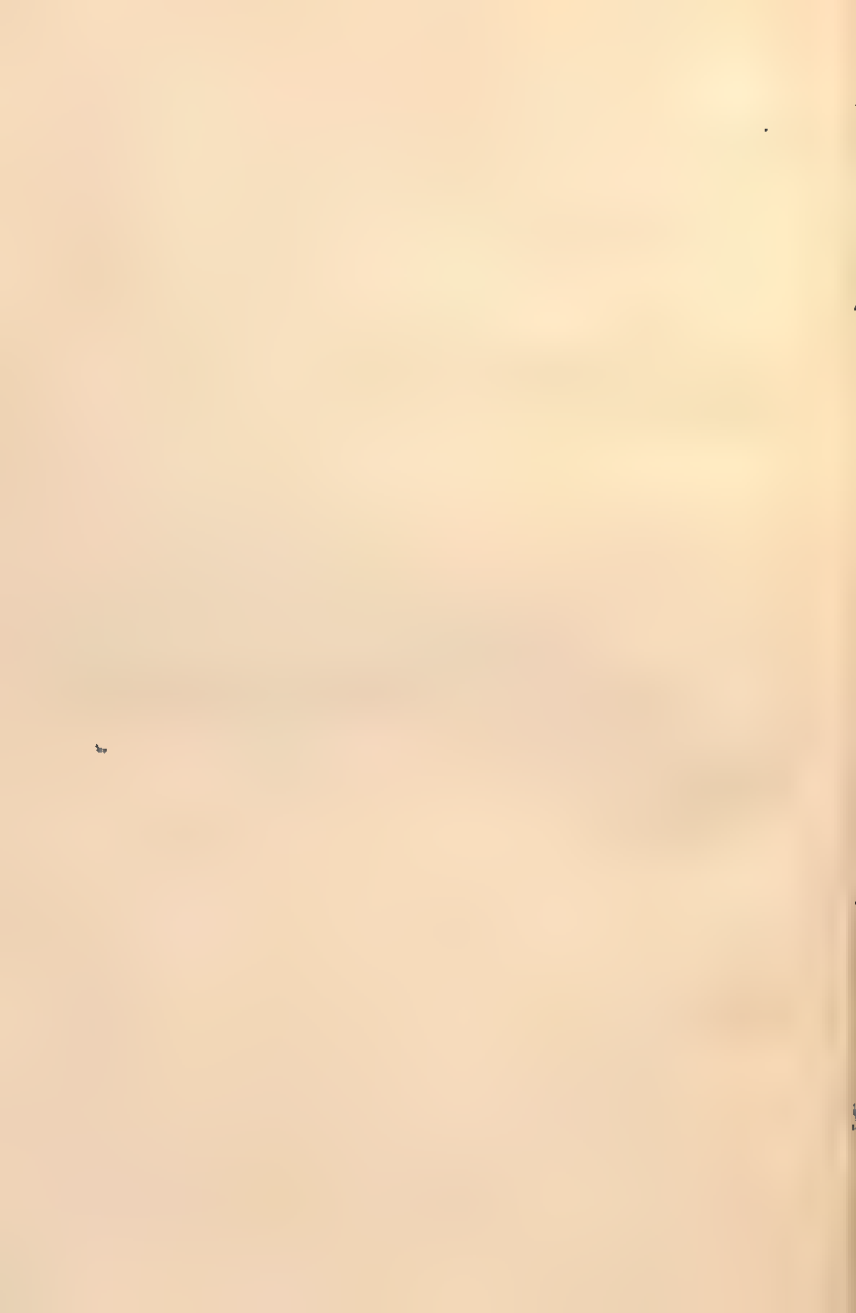
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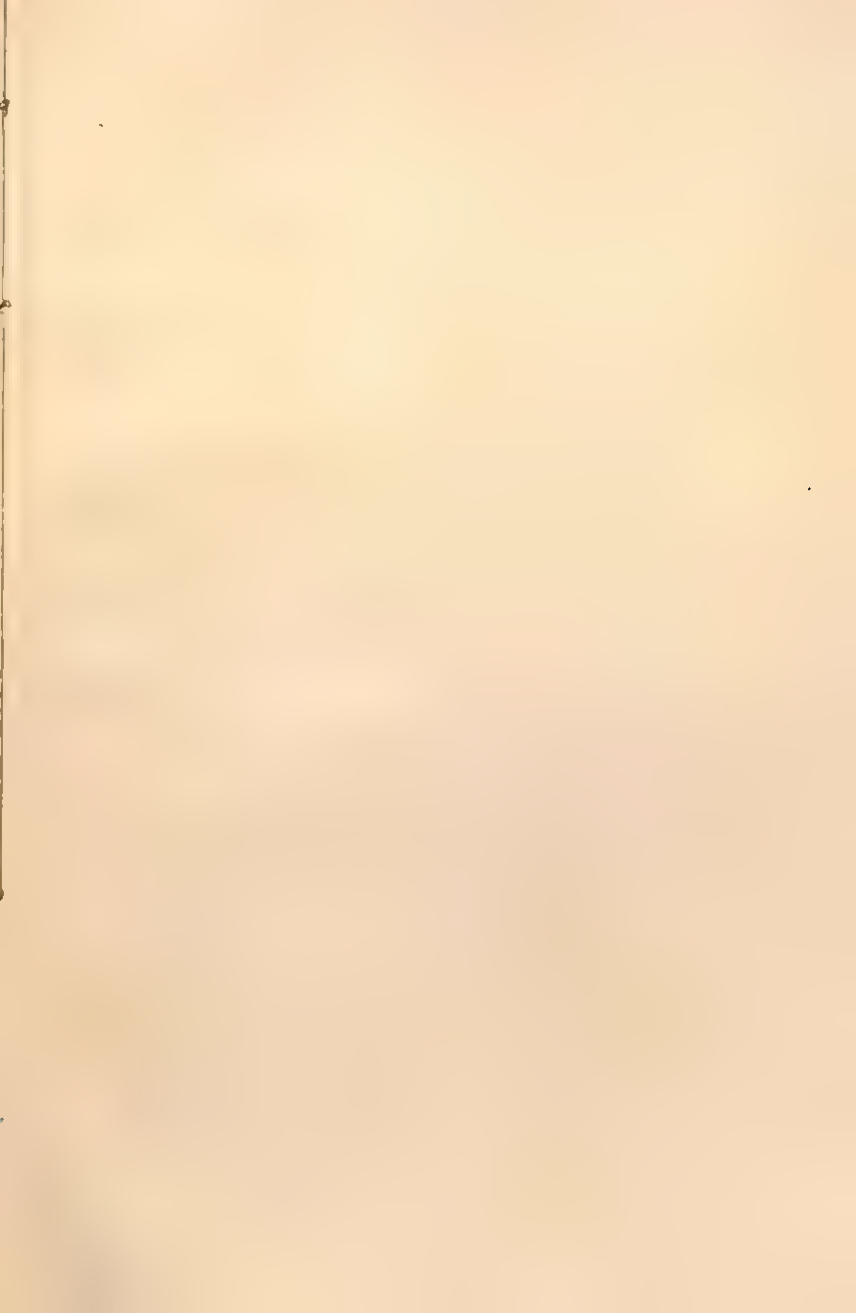


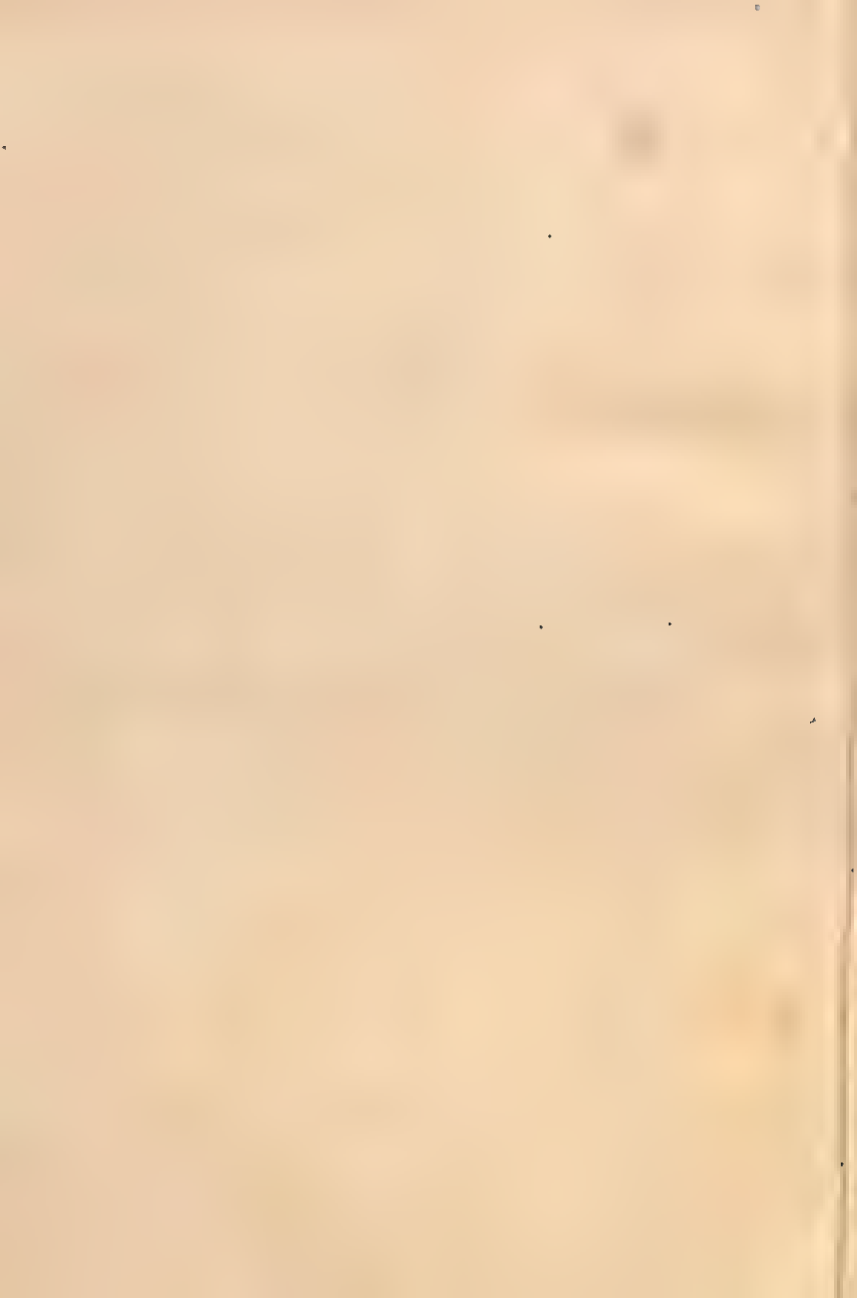
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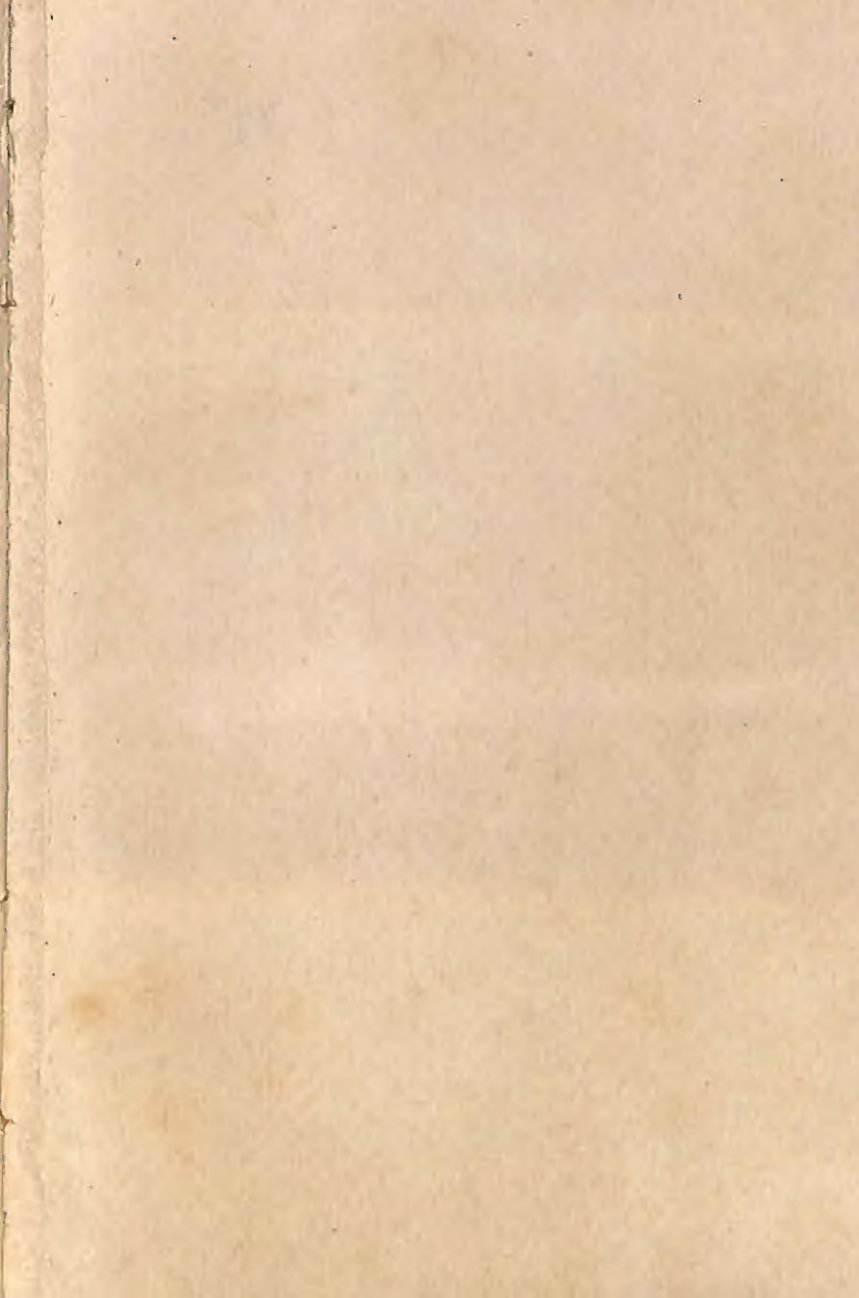
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